Proposal

DETERMINING THE RECEPTIVITY OF UNIX SOFTWARE IN THE DISCRETE MANUFACTURING SECTOR IN THE EUROPEAN MARKET

Submitted to

ANDERSEN CONSULTING

July 30, 1993

Submitted by

INPUT

The Atrium at Glenpointe
400 Frank W. Burr Boulevard
Teaneck, New Jersey 07666

201-801-0050
Fax: 201-801-0441

DETERMINING THE RECEPTIVITY OF UNIX SOFTWARE IN THE DISCRETE MANUFACTURING SECTOR IN THE EUROPEAN MARKET

I. Background

Andersen Consulting is considering porting MACPAC for the AS/400 to the HP/Informix Unix platform. Andersen wants to understand buyer reception to such a product offering. INPUT has completed a study addressing these isues for the U.S./Canadian market. INPUT has been invited to submit this proposal describing the research to be undertaken to gauge buyer receptivity in Europe.

II. Scope

This study will assess the European market and address the issues below.

- Within the discrete manufacturing sector, how likely are companies to replace their manufacturing, financial and distribution applications in the next three years? How much of the replacement will be packaged software?
- What will be the more important acquisition criteria used to select packaged software? (This includes, but is not limited to, cost, ease of use, features, portability, and vendor reputation.)
- What are customers' current plans for choosing products from specific vendors?
- How important is the technical environment to buyers in general? (This includes hardware platform, operating system, DBMS.) What are the perceived strengths and weaknesses of the UNIX platform as seen by prospective customers? How does the HP/Informix combination compare to other hardware/DBMS combinations?
- How does the market generally view porting manufacturing applications to the UNIX platform (as opposed to being written from scratch)? What are seen as the strengths and weaknesses of porting? How does the market view the AS/400 platform as a platform of origin?

- How large is the likely market in Europe for packaged software in the discrete manufacturing sector over the next three years? What is the likely share for Unix-based products?

- To what extent are the preceding "Scope" points affected by company size?

III. Conduct of the Work

INPUT proposes to answer the questions under "Scope" by conducting 210 structured telephone interviews among discrete manufacturing firms (as shown in Exhibit 1).

- The sample sizes for individual countries will be large enough to permit inferences about individual countries.

- Andersen may replace countries in the sample if this would better serve its purposes.

- Because of current events in Italy, results from that country may be anomalous.

INPUT will modify the U.S./Canada questionnaire in consultation with Andersen.

Respondents will not be informed of Andersen's sponsorship of the study. Company names of respondents will not be associated with detailed findings; Andersen will be supplied a list of companies interviewed and a distribution of types of titles of respondents. Respondents will be qualified as being in the recommendation/approval process for their company's manufacturing systems planning. As an incentive to supply information, respondents will be supplied a "sanitized" summary of the study, which will be reviewed with Andersen before release.

Questionnaire data will be reviewed for completeness and accuracy and entered into an analysis database, probably using the ABSURV analysis package; open-ended questions will be coded wherever possible. If Andersen desires, a copy of the database and/or completed questionnaires will be made available to Andersen, with respondent identifiers removed.

INPUT will prepare a written report as well as presentation materials (overhead transparency format) containing the study's findings. (INPUT and Andersen will agree on the sequence in which these materials will be supplied.) The report will contrast findings among the major geographies studies.

IV. Schedule

The study will be conducted according to the following schedule:

Week	Activity
1	Translate and modify U.S./Canada questionnaire
2	Conduct test interviews
3-6	Conduct remaining interviews
7	Data review and database input
8	Analyze results and prepare findings
9	Prepare and make presentation in Chicago
10	Prepare written report [Note: Activities in weeks 9 and 10 can be reversed.]

INPUT can begin work within two weeks of project authorization. INPUT does not recommend attempting actual interviewing during August. However, sample selection, questionnaire preparation, and translation could be done during that period.

V. Fee

INPUT's professional fee for this study will be $29,000. One half of this amount ($14,750) is due and payable at the time of project authorization. The remainder plus expenses is due at the submission of the final report. Out-of-pocket expenses (primarily travel and telephone charges) are not expected to exceed $11,000.

AUTHORIZATION

To authorize the project as specified, please sign and return one copy of this proposal along with the initial fee. Upon acceptance by INPUT, a countersigned copy of the proposal will be returned to Andersen.

AUTHORIZED BY:	ACCEPTED BY:
Andersen Consulting	**INPUT**
_____	_____
Name	Name
_____	_____
Title	Title
_____	_____
Date	Date

Exhibit 1

INTERVIEW DISTRIBUTION BY COUNTRY

Country	Number of Interviews
U.K.	30
Germany	30
France	30
Spain	30
Benelux	30
Scandanavia	30
Italy	30
TOTAL	210

INPUT®

Atrium at Glenpointe, 400 Frank W. Burr Blvd., Teaneck, NJ 07666 (201) 801-0050
Fax (201) 801-0441

FAX TRANSMITTAL FORM

Date: Aug 2

Confidential: Y / N
Urgent: Y / N

To: Name: Brian Pawlus

Tel./Location: 312-507-7848

Co.: Andersen Consulting

Page: 1 of 7

Fax No: 507-1043/1048

File: Chron
Contact
Other:

From: Tom O'Flaherty

Subject: Revised European Proposal

ADM 341/05 1/92

INPUT®

Atrium at Glenpointe, 400 Frank W. Burr Blvd., Teaneck, NJ 07666 (201) 801-0050
Fax (201) 801-0441

FAX TRANSMITTAL FORM

Date: Sept 9

Confidential: Y / N
Urgent: Y / N

To: Name: Peter Lower

Tel./Location:

Co.:

Page: 1 of 15

Fax No:

File: Chron
Contact
Other:

From: TA²

Subject: Andersen Study.

(1) Spoke to Andersen this morning. They still haven't decided on "secondary contrib", but are meeting this afternoon + are supposed to decide then. ~~I should know tomorrow (Wed)~~

(2) Called back to say that list in ~~an.~~ proposal (attached) will be used [He understands our reservations on Italy, but we'll do the best we can]

(3) An additional question which was asked as a follow-on, but can be integrated here. I have enclosed questionnaire with suggested sequencing.

ADM 341/05 1/92

(4) This additional question was added on at the end of the study (respondents were recalled) & a fixable version was prepared, although we found it wasn't necessary in the U.S.

APPLICATIONS DIRECTIONS IN THE MANUFACTURING SECTOR

I am calling from INPUT, a research and consulting firm in Teaneck, New Jersey. We are conducting a study on applications development in manufacturing. The information that you provide will be confidential and neither your name nor your company's name will be connected with any of the information in this study. In return for your assistance, we will provide you with a summary of the study's findings at no charge.

I would like to understand your personal involvement with manufacturing applications. Please tell me how you are involved (circle "**approve**" and/or "**recommend**" as appropriate):

- Approve/recommend expenditures
- Approve/recommend new applications
- Approve/recommend changes to the technical environment
- Approve/recommend vendors to be used

[If none of the above are circled, ask respondent what person they would recommend, thank them and terminate the survey.]

1a. Which of the following applications may be replaced in your firm in the next three years? What is the approximate probability of this occurring (for each application)? [Use table below.]

1b. Is your firm considering the use of a software package for applications that may be replaced? What is the probability of using a package? [Use table below.]

Application	% Prob	Package % Prob
MRP	_____	_____
Distribution	_____	_____
Engineering	_____	_____
Financials	_____	_____

IF PACKAGES ARE BEING CONSIDERED, GO TO 3.

1c. Would you consider an integrated application solution from one vendor, i.e., an application solution that would combine, for example, the manufacturing, distribution, and financial components?

_____

_____

_____

2a. Why are packages not being considered?

_____

_____

_____

2b. What changes would make your firm consider using a package?

_____

_____

_____

Thank you for your cooperation. We will send you a study summary in about six weeks.

3a. What is driving the replacement?

_____

_____

_____

3b. In evaluating software packages for the applications above, please rate the importance of the following selection criteria below, using a scale of 1 to 5, with 5 being highest importance. Please comment on your rating; for example, if the criteria apply to one application more than another.

Criteria	**Rating**	**Comments**
Functionality	_____	_____
Ease of Use	_____	_____
Client/Server Technology	_____	_____
Installation Support by Vendor	_____	_____
Cost	_____	_____
Portability	_____	_____
Vendor reputation	_____	_____
Global Presence by Vendor	_____	_____
Other:		
_____	_____	_____
_____	_____	_____

3c. Which hardware/operating systems are being considered?

_____

_____

3d. What people or organizational units will be involved in making evaluations?

_____

_____

4. Is your firm currently evaluating packages?

Yes _____ No _____

If yes, which one(s)?

_____

_____

_____

5a. Some of the major operating environments that a package can run on include UNIX, AS/400, OS/2, Windows NT, and MVS. What do you see as the strengths and weaknesses of each of these as the operating environment for your applications?

	Strengths	**Weaknesses**
UNIX	_____	_____
	_____	_____
AS/400	_____	_____
	_____	_____
OS/2	_____	_____
	_____	_____
Windows NT	_____	_____
	_____	_____
MVS	_____	_____
	_____	_____

5b. Overall, on a scale of 1 to 5, with 5 being highest, how well do you think that each of these environments would meet your needs in 1994? In 1996? If there is a change, what is the reason?

	1994	1996	Reason
UNIX	_____	_____	_____
AS/400	_____	_____	_____
OS/2	_____	_____	_____
Windows NT	_____	_____	_____
MVS	_____	_____	_____

6a. Consider a fully functional, mature application written for an operating system other than UNIX. What do you see as the advantages and disadvantages of re-engineering that application (and porting it) to run under the UNIX environment?

Advantages

_____

_____

Disadvantages

_____

_____

6b. What do you see as the advantages and disadvantages for re-engineering the application from an MS-DOS base to a UNIX environment?

Advantages

_____

_____

Disadvantages

_____

_____

6c. From the AS/400?

Advantages

_____

_____

Disadvantages

_____

_____

7a. (insert)

In evaluating UNIX-based manufacturing packages, firms often classify packages fall into one of the following categories [read "category" list below]:

Category	(1) Same Price	(2) Price Differs	(3) AS/400 to UNIX	(4) Native UNIX
Exceeds requirements	___	___	___	___
Meets all requirements	___	___	___	___
Meets minimum requirements	___	___	___	___

All things being equal, what would your firm's preference be between the three categories? (Rank 1, 2, 3, with 1 = first choice; fill in column 1 above).

Would these rankings change if the there was a substantial increase in price to obtain for the increased functionality?

Yes ___ No ___

o Why?

o If Yes, please adjust ranking above [column 2]

7b. Please consider the situation of two UNIX-based manufacturing packages that are comparable in price, maintainability and functionality, but differ in that

o One was written for the native UNIX environment; and

o The other was a UNIX package that had been re-engineered from a proven AS/400 application

o Would you still rank packages the same as before?

Yes ___ No ___

If No:

- Why? [please have respondent discuss]
- How would the rankings change? (fill in columns 3 and/or 4, as appropriate)
- What would have to be changed in order for you to give packages from these two sources [native UNIX and AS/400 to UNIX] identical rankings?

8 ~~7~~a. A number of major hardware and DBMS vendors offer UNIX-based products which could be used as platforms to run applications on. On a scale of 1 to 5 (with 5 being highest), how would you rate the suitability of the following UNIX-based products for running manufacturing applications software?

[Note: "Don't know" is acceptable.]

Hardware	**Rating**	**Reason (if 1/2 or 4/5)**
DEC (Alpha)	_____	_____
HP	_____	_____
IBM (RS6000)	_____	_____
Sun	_____	_____
Software		
Informix	_____	_____
Oracle	_____	_____
Progress	_____	_____
Sybase	_____	_____

8 ~~7~~b. Are there particular hardware/DBMS combinations in the preceding list that you believe would be especially attractive as a UNIX platform to your organization?

_____

_____

_____

8 ~~7~~c. Are there other combinations not listed that would be attractive as a UNIX platform?

_____

_____

_____

98. If the designers of a manufacturing software asked your advice on what should be included in the next generation of software, what advice would you give?

_____

_____

_____

THANK YOU FOR YOUR PARTICIPATION.

Thank you very much for agreeing to answer a followup question involving how you and your firm would evaluate packages which were developed using different approaches.

Please refer to the diagram title, "Evaluation of UNIX-Based Manufacturing Packages", that was faxed to you earlier.

1a. What would your preference be between the six different packages shown in the diagram? Please rank them from 1 to 6, with 1 being your first choice. **It's fine if you want to give two or more choices the same rank (that is, award ties).**

A ___

B ___

C ___

D ___

E ___

F ___

1b. Please briefly explain why you gave them these rankings?

(ASK THE FOLLOWING IF APPROPRIATE:)

1c. I notice that you gave a different rank to:
[name either or both, depending on rankings]

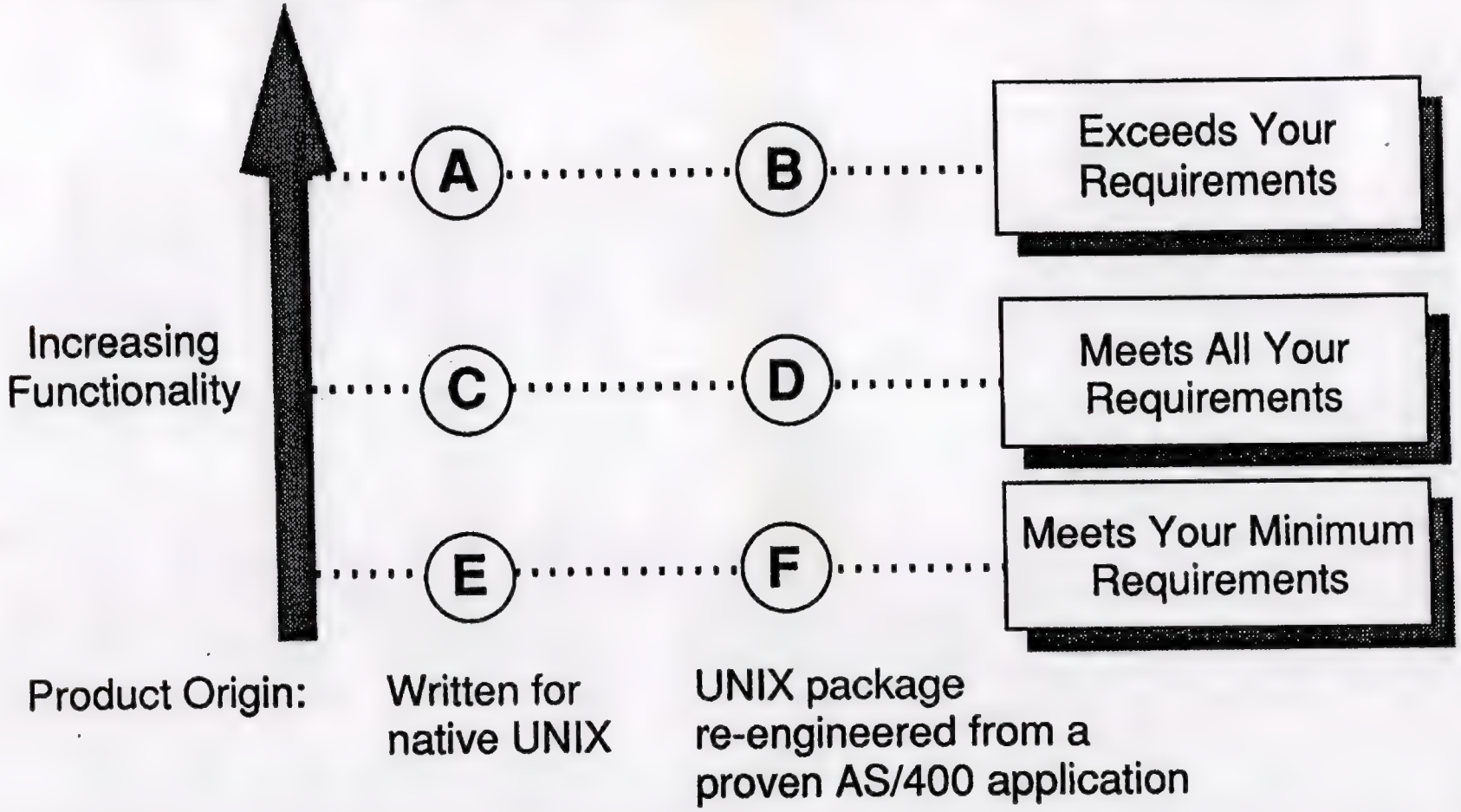
A and B

C and D

What, if anything, would have to be changed in order for you to give that pair **[those pairs]** an identical ranking?

Evaluation of UNIX-Based Manufacturing Packages

[Circled letters refer to different hypothetical software packages]



- Assumes that price, maintainability, and technical factors (e.g., response time, reliability) are equivalent for native UNIX and re-engineered packages)

YA7

Report

DETERMINING THE RECEPTIVITY OF UNIX SOFTWARE IN THE DISCRETE MANUFACTURING SECTOR IN THE EUROPEAN MARKET

Submitted to

ANDERSEN CONSULTING

November 30, 1993

Submitted by

INPUT

The Atrium at Glenpointe
400 Frank W. Burr Boulevard
Teaneck, New Jersey 07666

201-801-0050
Fax: 201-801-0441

I. BACKGROUND AND METHODOLOGY

A. Background

Andersen Consulting is considering porting MACPAC for the AS/400 to the HP/Informix platform. Andersen wishes to understand buyer reception to such a product offering. INPUT was originally commissioned in June 1993 to conduct market research in the U.S./Canada market to gauge likely buyer receptivity. The research consisted of 125 structured interviews with discrete manufacturing firms in the U.S. and Canada. (In July 1993 INPUT conducted a follow-on study from a subset of the sample to gauge to acceptability of native UNIX versus re-engineered AS/400 manufacturing packages.)

In September 1993, INPUT was requested to conduct the same research in seven European countries. This report contains the results of this European research. This report follows the same structure as the earlier report to the extent possible (including exhibit numbering) to facilitate comparisons. This report draws attention to similarities and differences that INPUT finds noteworthy.

B. Methodology

The questionnaires used were identical to those used in the earlier study.

Respondents were qualified and categorized in the following ways:

- Thirty firms were interviewed from each of the following countries: the UK, France, Germany, Benelux, Spain, Italy, Sweden. This produced a total of 210 interviews.
- Discrete manufacturing firms were interviewed.
- Company sizes are shown in Exhibit I-1.
- Firms interviewed planned at least one replacement for a manufacturing-related application in the next three years. [If no replacement was planned, the company was excluded from the rest of the study.]
- Packaged software should be considered for at least one application by those planning a replacement.
- Respondents should be part of the recommendation/approval process for selecting new applications.

Respondents were classified by both their title level and their organizational area (Exhibit I-2).

- About one-third of the respondents were from the IS area, most of them in executive positions.
- Almost all of the remaining interviewees came from management positions in applications or functional areas.
- Applications specialists, either in a functional area or in an applications, unit accounted for the remainder of the interviewees.
- This mix is consistent with other INPUT studies which have shown a steady migration, or sharing, or responsibilities between the traditional IS unit, end user areas and new organizational structures which address application systems needs.

Respondents were quite forthcoming and frank and answered questions as completely as they could.

The questionnaire was a mixture of rating questions and open-ended questions. Where there were clusters of answers in an open-ended question, these were grouped and classified. In other cases, where the number of responses were too small or responses were quite scattered, extracts of the actual replies are presented.

The data which follows shows results for the entire sample of respondents as well as for individual countries where there is enough data to support individual country analysis. The convention is used throughout the report of titling country exhibits "..a" through "..f" after an initial "European" exhibit. The "European" are unweighted, that is, the results from the seven countries are added and divided by seven; Andersen may wish to apply other weights. (However, INPUT experimented with some weighting and found that it did not affect the overall results appreciably.)

II. APPLICATIONS REPLACEMENT AND MARKET SIZE

A. Replacement Plans

Near term replacement plans are a critical factor for Andersen's plans. Exhibit II-1 shows a high degree of replacement planned in all major areas. Financial applications show the highest replacement rate. Overall, these findings are similar to that for the U.S.

Respondents were asked to assign probabilities to replacement.

- Probability of replacement is high, although somewhat lower overall than in the U.S. study.
- The situation appears to be broadly the same across individual countries.
- These percentages exclude those who could not give a probability; therefore, the replacement rates may even be conservative.

These replacement plans are driven by a variety of factors, many of them mutually reinforcing. Exhibit II-2 has classified these reasons using the same categories as for the U.S, study. The priorities are in the same general order, although the intensity of needs in Europe appears somewhat lower than in the U.S. (Note: There was not enough data from individual countries to provide meaningful breakdowns by country.)

About half the respondents are likely to use packaged software as the replacement (Exhibit II-3). Europeans appear less likely to consider packaged engineering software than U.S. firms. This picture holds true across individual countries.

- In the U.S. virtually all firms are *considering* packaged software (the figures in Exhibit II-3 are for firms that give packaged software use a probability of 75% or more). However, in Europe, for each of the applications a third or more of firms are not currently considering packaged software.
- Almost half the firms surveyed are in fact evaluating one or more packages now (Exhibit II-4). This is the same situation as in the U.S.
- Exhibit II-5 is a list of applications packages which firms were willing or able to cite as currently under evaluation. Note the wide array of vendors; no vendor appears to have a lock on this market. (Note: Because of translation and transcription, not all of the packages -- especially acronyms -- may have been captured accurately.)

Exhibit II-6 shows the hardware/software operating environments being considered for new applications (in some cases there is more than one under consideration).

- As in the U.S. the UNIX environment is being considered more than any other single environment.
- The proprietary environments as a group are being looked at by about four out of ten of the firms interviewed.
- Note that the AS/400 was the most frequently cited environment, slightly more than in the U.S..
- INPUT believes that the proprietary platforms are more likely to be rejected in the evaluation process.
- On the other hand, Windows NT and its successors are likely to be much more of a factor in the medium term, i.e., further out than three years.

Overall, INPUT believes that UNIX-based applications will prove to be quite acceptable in this market. INPUT believes the UNIX proportion of the overall market to be in the 40-50% range over the next three years.

- Further out, much will depend on both the real and apparent success of NT (and OS/2, to a degree).
- The result is a window of opportunity in the short term and the potential for greatly increased competition in the longer term. Therefore, INPUT believes that early entry by Andersen into the UNIX market will be a key success factor.

III. PACKAGE SELECTION CRITERIA

The package selection criteria are arranged in Exhibit III-1 in the order of importance found in the U.S. study.

- Functionality and ease of use are more important in the U.S. than in Europe. In the U.S. nine out of ten companies found these two criteria important.
- Otherwise, the pattern is similar between the U.S. and Europe.
- There are some apparent differences between European countries. However, INPUT believes that more study would be required before placing absolute reliance on these figures (largely because of sample sizes).
- Technology factors (client/server and portability) are the least important factors on the list, as in the U.S..

The survey looked at these issues another way, by asking respondents what advice they would give to vendors on what should be included in the next generation of software. These results are reported in Exhibit III-2. European respondents had less advice to give than their U.S. counterparts, so the results could not be meaningfully reported by country.

- The general category of a better technical environment and associated efficiency and performance were issues cited by many of the respondents.

As in the U.S., the actual software package selection process is generally a joint effort in the companies interviewed, with representatives from both IS and the functional area(s) involved.

IV. ASSESSMENTS OF OPERATING ENVIRONMENTS

A. General Assessments of Operating Environments

Respondents were asked to rate five of the principal operating environments (Exhibit IV-1).

- UNIX received the highest ratings, OS/2 and MVS the lowest. The pattern is very similar to the U.S. findings. Overall the European respondents rated all operating environments somewhat lower than ratings given in the U.S.

- The low ratings are quite low for this kind of survey; the UNIX ratings are acceptable, but do not indicate an impregnable position. Note that Germany, France and Benelux give UNIX much higher ratings

- There was little difference between ratings for 1994 and 1996.

In addition to the single point ratings above, respondents were also asked to give what they saw as the strengths and weaknesses of these operating environments. The comments for each operating environment are in Exhibits IV-2 through IV-11.

- These strengths and weaknesses, while covering a lot of ground, do not contain any real surprises.

- Exhibit IV-12 provides an unweighted summary of the points made (this exhibit is taken from the U.S. study).

- INPUT draws attention to Windows NT: The main weakness is that it is new.

Exhibit IV-13 provides an "index" of the strengths and weaknesses for each environment by counting the number of items mentioned as a strength or weakness and dividing by the total number of respondents; this takes into account of multiple reasons given by some respondents. The picture for individual countries is very similar. There are interesting differences between the U.S. and Europe:

- There were many more comments in Europe, especially for UNIX, AS/400 and Windows/NT. This may reflect cultural differences somewhat, where U.S. respondents to this kind of study are more comfortable with rating questions (as in Exhibit IV-1) and Europeans more comfortable with open-ended questions.

- UNIX scores extremely high. Windows/NT scores high also, considering respondents unfamiliarity with this new product.

- OS/2 and MVS (included for "control" purposes) rank about as low as in the U.S.

B. Suitability of Selected UNIX Platforms for Running Manufacturing Applications

In the preceding section, general environments were evaluated. Respondents were also asked about the suitability of specific UNIX hardware and DBMS environments for running manufacturing applications.

- HP was rated as the most suitable hardware platform (Exhibit IV-14). Sun, IBM and DEC (Alpha) were all fairly close behind. The general priorities are the same as in the U.S., however, U.S. ratings were about a point higher overall compared to Europe.

DBMS products were clustered fairly tightly, about the same as in the U.S. (Exhibit IV-15).

Respondents are asked to cite particular hardware/DBMS combinations that they "believed would be particularly attractive". Exhibit IV-16 lays out these volunteered responses.

- In some case multiple combinations were provided.
- In other cases, respondents would name only a hardware or only a DBMS platform.
- In hardware, HP was cited most overall. (IBM was relatively more popular in the U.S.)
- Oracle and Informix were the most cited among the DBMSs. (Sybase was cited much more often in the U.S.) Ingres' rate of citation was exceptionally good, given that Ingres was not part of the formal questionnaire process.
- No particular combinations were dominant; only the HP/Oracle combination broke into double digits; some combinations were not cited at all.
- The Informix/HP pair was only cited four times. [Note: This question was asked after and as a follow on to the rating question, so Informix was positioned as well as Oracle, Progress of Sybase for recall.]

It is INPUT's belief that the hardware part of the hardware/DBMS pairing will be more important in the marketplace. Consequently, HP's higher rating is more important than Informix's rating.

"Other" platforms and combinations were cited more often in Europe than in the U.S., as might be expected given the more fragmented market, especially for hardware. (See Exhibit IV-17.)

V. UNIX PORTING ISSUES

A. Attitudes Toward Porting

One of the sections of the interview focussed on respondents' attitudes toward re-engineering/porting of an application to UNIX that was originally written for another operating system. There were three related sets of questions asked:

- The general advantages and disadvantages in going from a non-UNIX to a UNIX environment.
- The specific advantages and disadvantages in going from the AS/400 to UNIX.
- The advantages and disadvantages in going from MS-DOS to UNIX [This was a "control" question.]

Exhibits V-1 to V-6 provide the detail on the comments made for advantages and disadvantages.

- Overall, the advantages seen were an increased probability that an application would work and contain the necessary functions; also, that time and expense would be reduced.
- Disadvantages include a general doubt that such conversions can be effective along with the associated questions as to
  - Whether all of the original functionality will be carried over onto the new platform.
  - Whether full advantage will be taken of UNIX's capabilities.

Overall, Europeans were more favorably disposed to the principle of re-engineered applications than firms in the U.S., as shown in the summary in Exhibit V-7. Germany, France and Benelux were the most favorably disposed, the UK least.

- As in the U.S. there appeared to be an underlying belief that dissimilarities in architecture would cause problems.

INPUT believes that these findings should be taken into account when preparing the product for market, for example,

- Certain technical objections can be dealt with in advance (e.g., feature transference and UNIX efficiency).
- It might prove advantageous, for example, to point to the past use of the functional components without stressing the platform origins.
- Further research on the reaction of initial prospects may also be in order.

B. Comparing Acceptability of Native Unix and Re-engineered AS/400 ManufacturingSoftware Packages

This section reports on the relative acceptability of products written in native UNIX compared to products re-engineered from an existing AS/400 application. (This is comparable to the findings of the July 1993 U.S. followup study.)

1. Principal Approaches for Selecting Software

By looking at the rankings and taking comments into consideration, there are two principal ways in which software packages are selected.

- Companies for whom the software's origin (native UNIX or re-engineered AS/400) is the determining criteria; *then* the level of functional requirements is decided on. This is called the "vertical" selection approach in this report, since the *columns* in Exhibit V-8 are controlling. Almost two-thirds of the companies interviewed fall into this category.

- The other principal approach is for a company to first determine what level of requirements is most suitable and then decide which, if any, software origin is favored. This is called the "horizontal" approach here, because the *rows* in Exhibit 1 are controlling. About a quarter of the companies interviewed fall into this category.

- About 10% of the companies interviewed fall into a mixed category of selection, where complex combinations of requirements and software origin were used.

- These are very close to the U.S. findings.

Exhibit V-9 summarizes the preferences for the vertical, horizontal and mixed approaches. Within each approach there can be a further preference for native UNIX or re-engineered AS/400 (either origin can be acceptable in the horizontal or mixed approaches).

- Exhibit V-10 summarizes the preference for software origin.

  - Almost half prefer a native UNIX product

  - Over one-quarter prefer a re-engineered AS/400 product

  - About one-third would accept either (i.e., their motivation is purely requirements driven). This is much higher than in the U.S.

Exhibit V-11 combines the data from Exhibits V-9 and V-10 in a matrix, showing the combinations.

2. Importance of the Degree to Which Functional Requirements Are Met

In rating the importance of functional selection criteria, respondents almost always give first choice to either "exceeds your requirements" or "meets all your requirements". Respondents were split evenly between which of the two was most important. "Meets minimum requirements" was usually the third choice.

This split was uniform between "vertical" and "horizontal" selection criteria as well as whether native UNIX or re-engineered AS/400 was favored.

Exhibit V-12 summarizes this situation. (Exhibit V-12 is the same as in the U.S. report.

3. Reasons for Preference

Because of the way in which the issues were presented to the respondents, the reasons for preferring native UNIX over re-engineered AS/400 (or vice-versa) are a mixture of positives and negatives.

- Native UNIX is seen as a better technical fit and more efficient than a re-engineered AS/400 product.
- As found earlier, there seems to be fairly wide doubt whether all of the functionality of the re-engineered product can be carried over onto the UNIX platform and whether full advantage will be taken of the UNIX's technical capabilities.
- The re-engineered AS/400 product, on the other hand is seen as a tested, working product.

4. Likelihood of Equating Native UNIX and a Re-engineered AS/400 Product

After respondents had stated their preferences, they were probed as to the conditions under which they would be willing to change their preference (i.e, to put native UNIX and re-engineered AS/400 on the same footing).

Having taken a position favoring either native UNIX or a re-engineered AS/400 product, even more respondents than in the U.S. were quite resistant to describing the conditions where the other product would be viewed equally. The comments appear to be in line with the more extensive U.S. comments which are reproduced in the following exhibits.

- Exhibit V-13 contains comments which illustrate the resistance toward re-engineered AS/400 products by those favoring native UNIX.
- Exhibit V-14 contains comments coming from those favoring a re-engineered AS/400 product and resistant to native UNIX.

The reasons for resistance are similar to those supporting a particular software origin in the first place.

Another, somewhat smaller group *would* consider the alternative. These comments can be summed up as: "Prove there isn't much difference and I'll consider alternatives."

5. Summary

The origins of a software product for the UNIX platform are important.

- A large group of companies will confine their evaluations to either native UNIX or re-engineered AS/400 products (given that choice).
- Even where meeting or exceeding requirements is the primary criterion, the origin of the software is still important.

About half of the companies interviewed would prefer native UNIX products. They are not sure that all of the functionality of a re-engineered AS/400 product would survive and, an overlapping thought, are not sure that the re-engineered product would take full advantage of the UNIX environment.

Exhibit I-1

Respondent Size by Country

	Size of Company ($MM)			
Country	$50-100	$101-500	$501-1,000	Over $1,000
UK	12	8	4	6
France	15	10	3	2
Germany	14	5	5	6
Benelux	15	7	4	4
Spain	15	11	1	3
Italy	14	11	4	1
Sweden	14	9	5	2
TOTAL	99	61	26	24

Exhibit I-2: Europe

Respondent Titles (Classified)

	Organizational Area			
Title/Level	1 General IS	2 Appli-cations	3 Functional User	Total
Unit Head	43	14	87	144
Middle Managers	24	11	9	44
Analysts/ Specialists	0	3	4	7
TOTAL	67	28	100	195

Note: 15 titles could not be easily classified.

Exhibit II-1: Europe

Percent of Companies Planning to Replace Selected Applications in Next Three Years

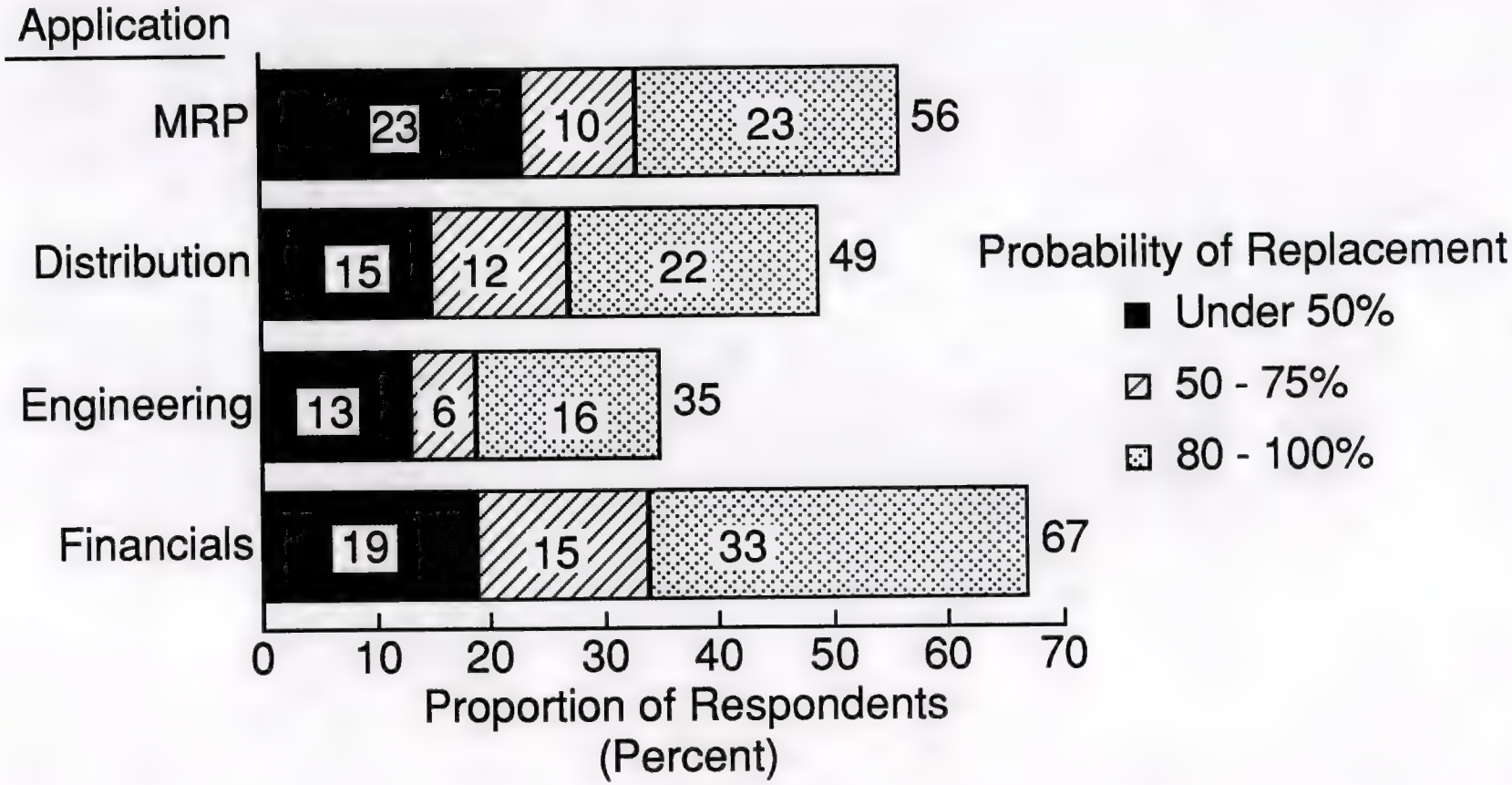


Exhibit II-1a: U.K.

Percent of Companies Planning to Replace Selected Applications in Next Three Years

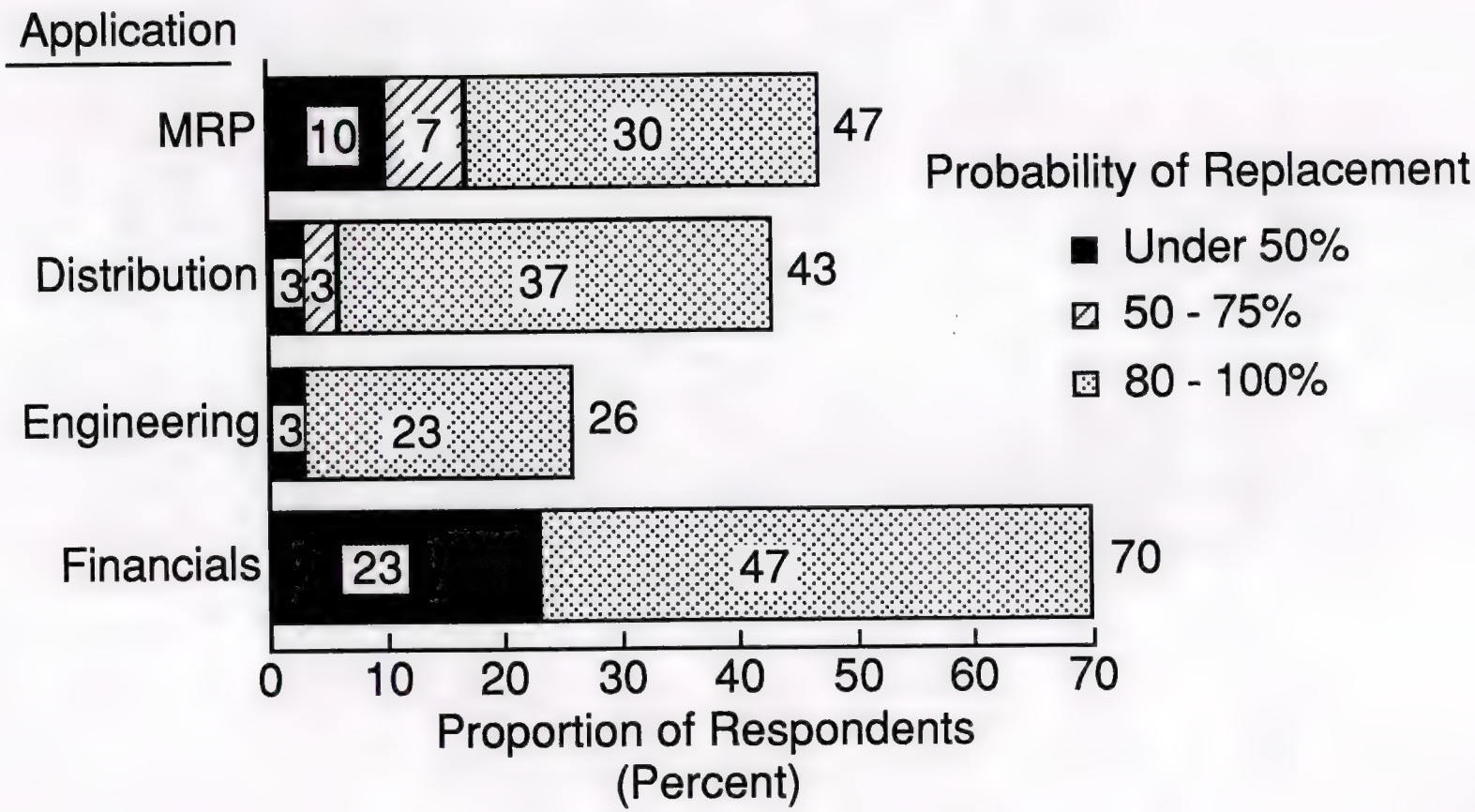


Exhibit II-1b: France

Percent of Companies Planning to Replace Selected Applications in Next Three Years

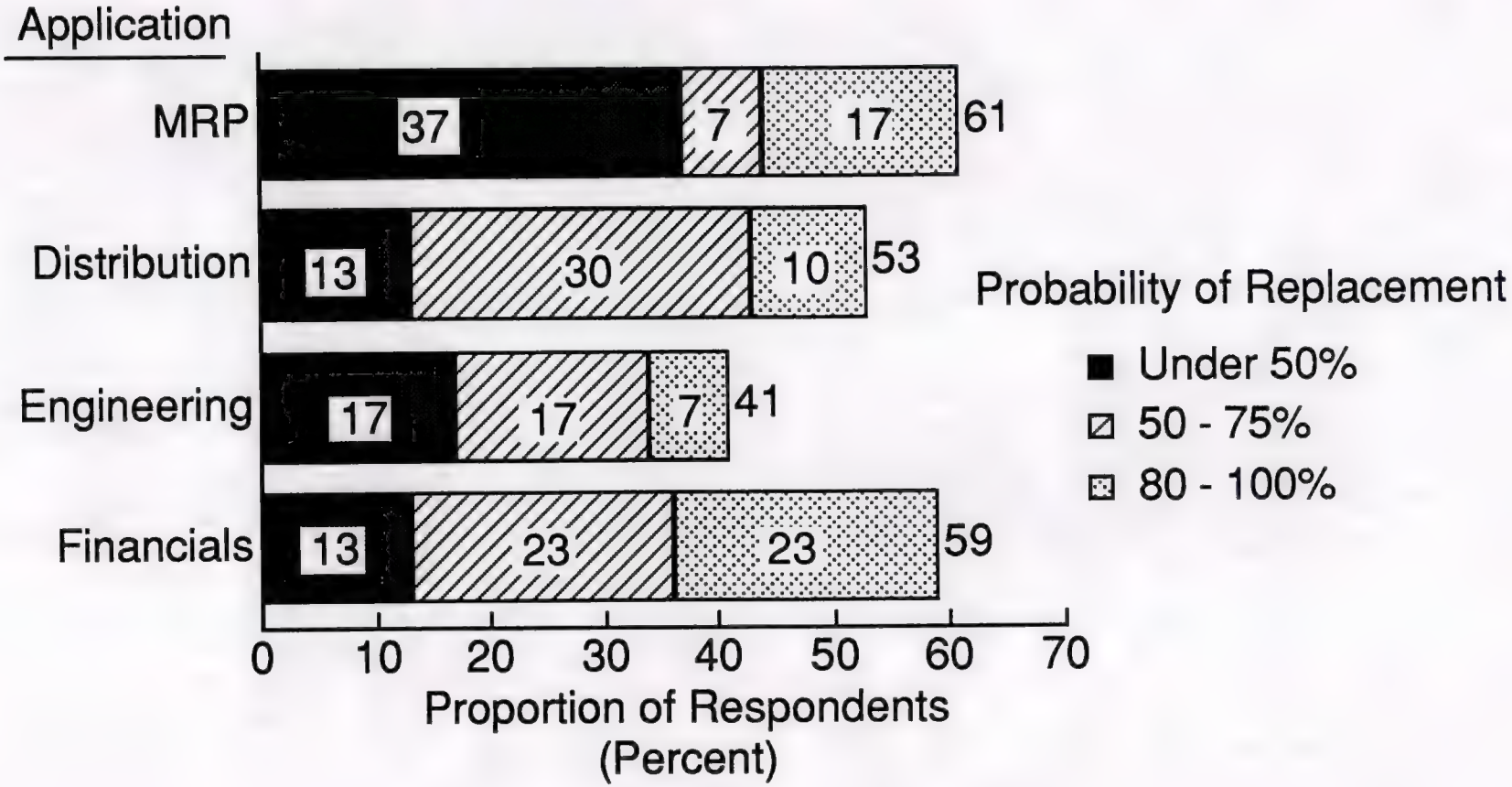


Exhibit II-1c: Germany

Percent of Companies Planning to Replace Selected Applications in Next Three Years

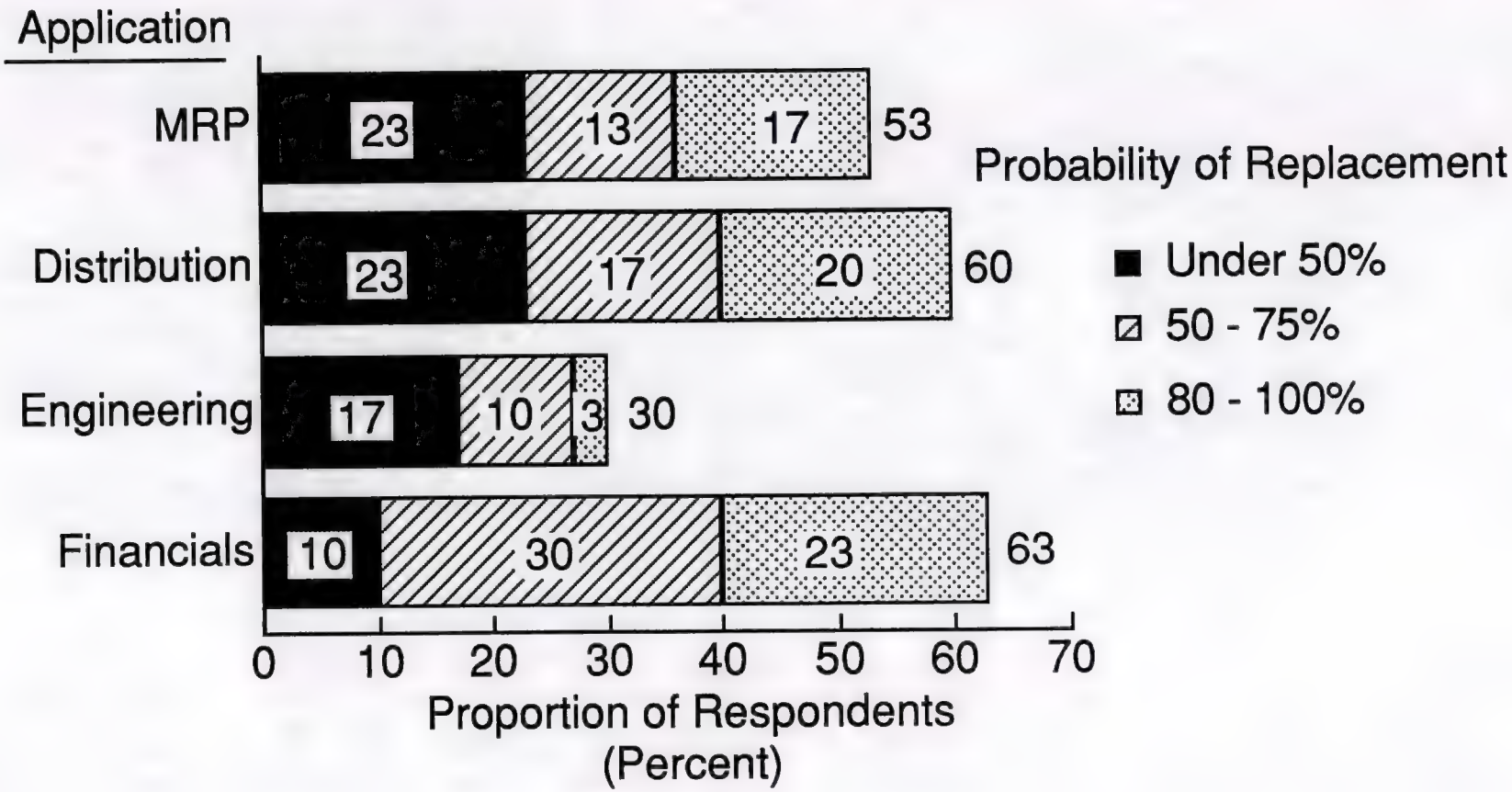


Exhibit II-1d: Benelux

Percent of Companies Planning to Replace Selected Applications in Next Three Years

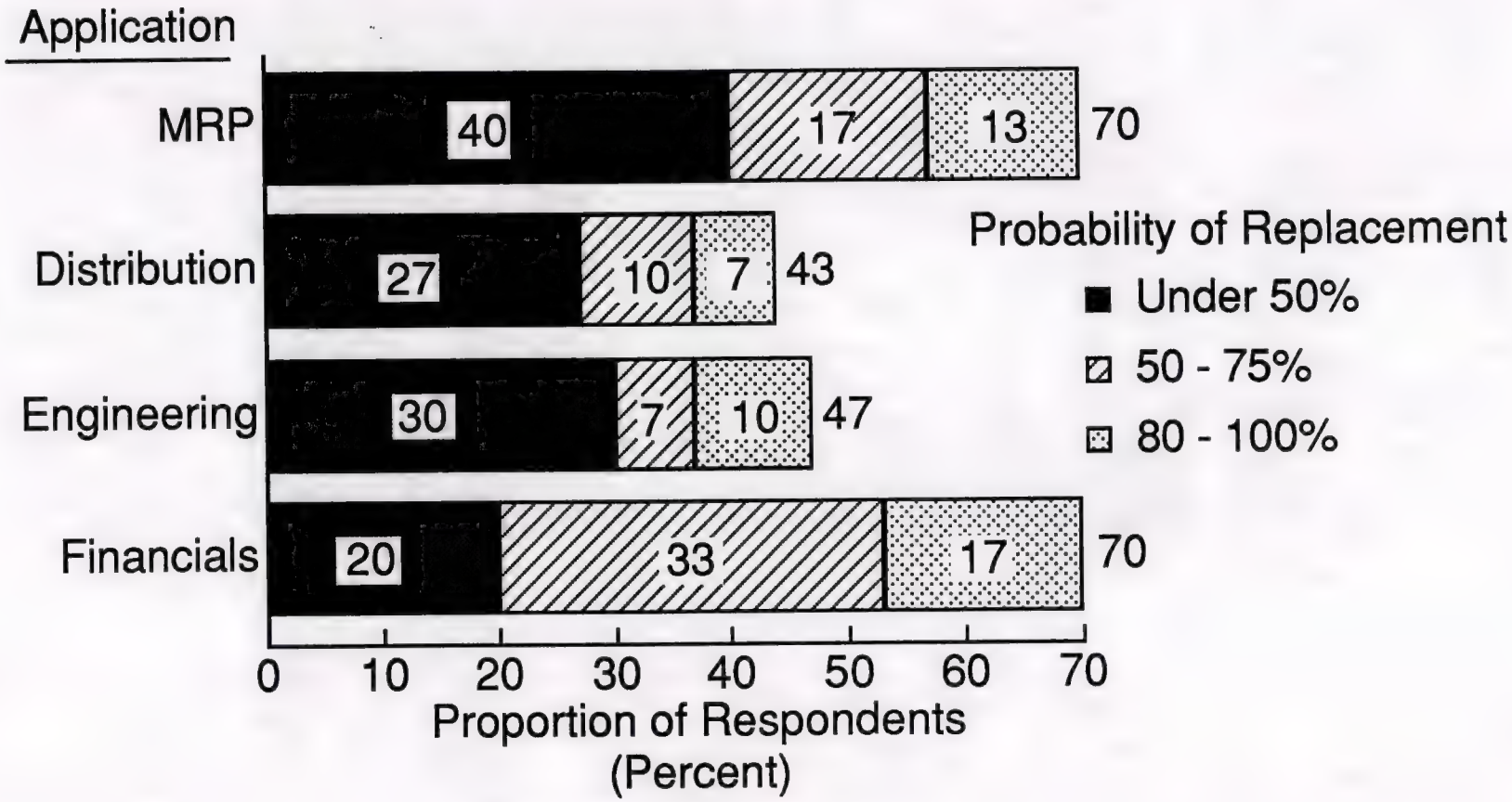


Exhibit II-1e: Spain

Percent of Companies Planning to Replace Selected Applications in Next Three Years

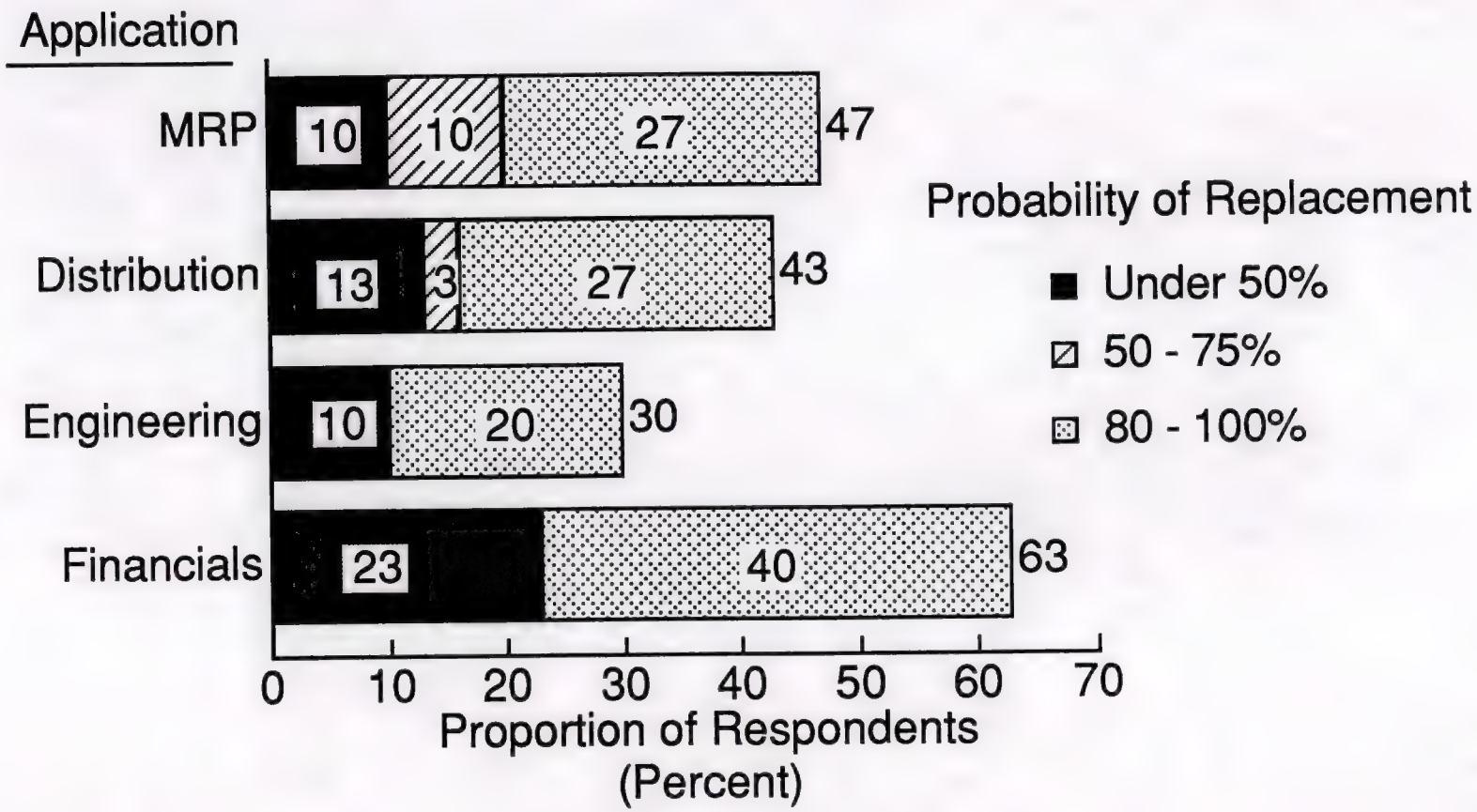


Exhibit II-1f: Italy

Percent of Companies Planning to Replace Selected Applications in Next Three Years

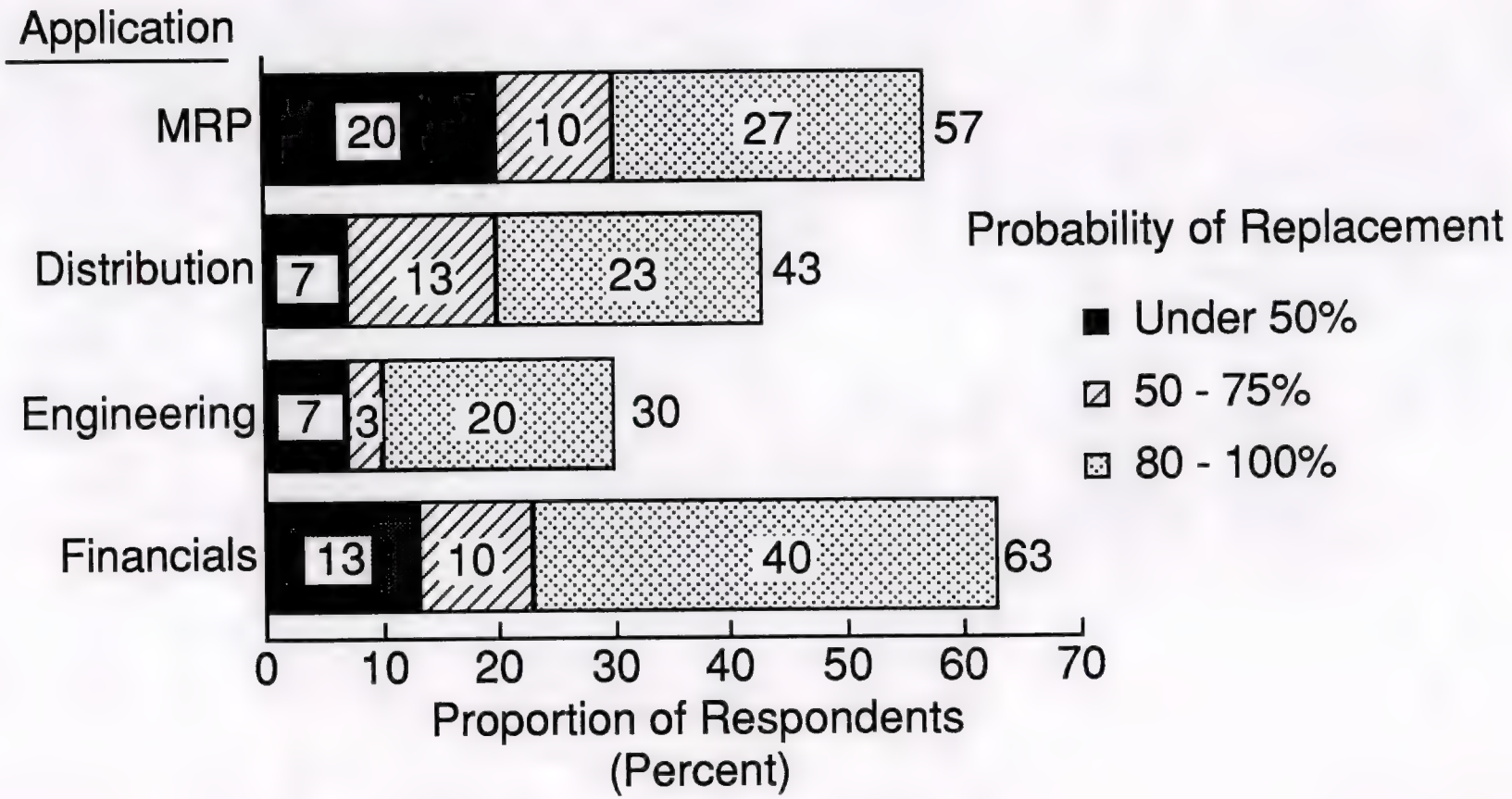


Exhibit II-1g: Sweden

Percent of Companies Planning to Replace Selected Applications in Next Three Years

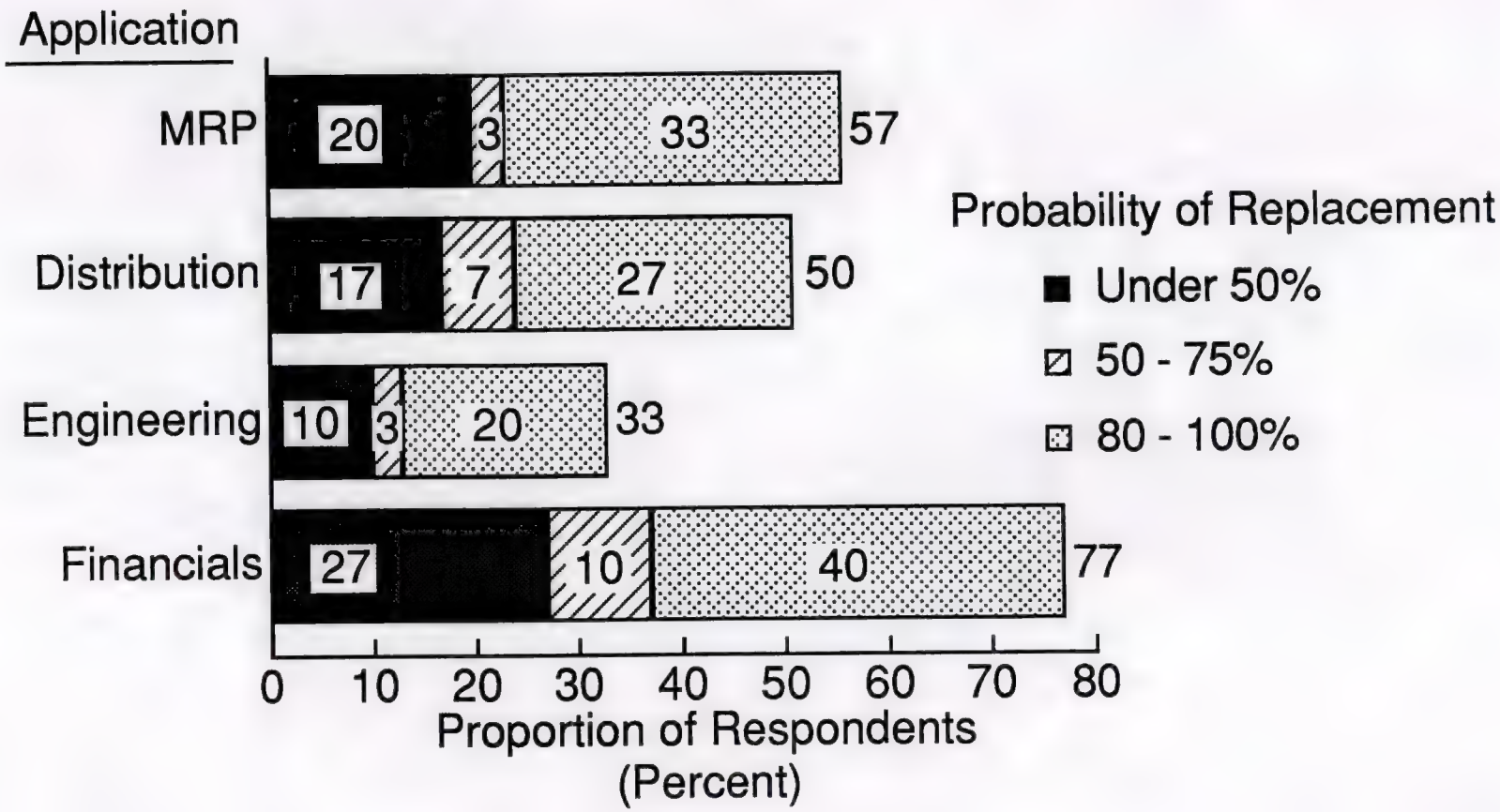


Exhibit II-2

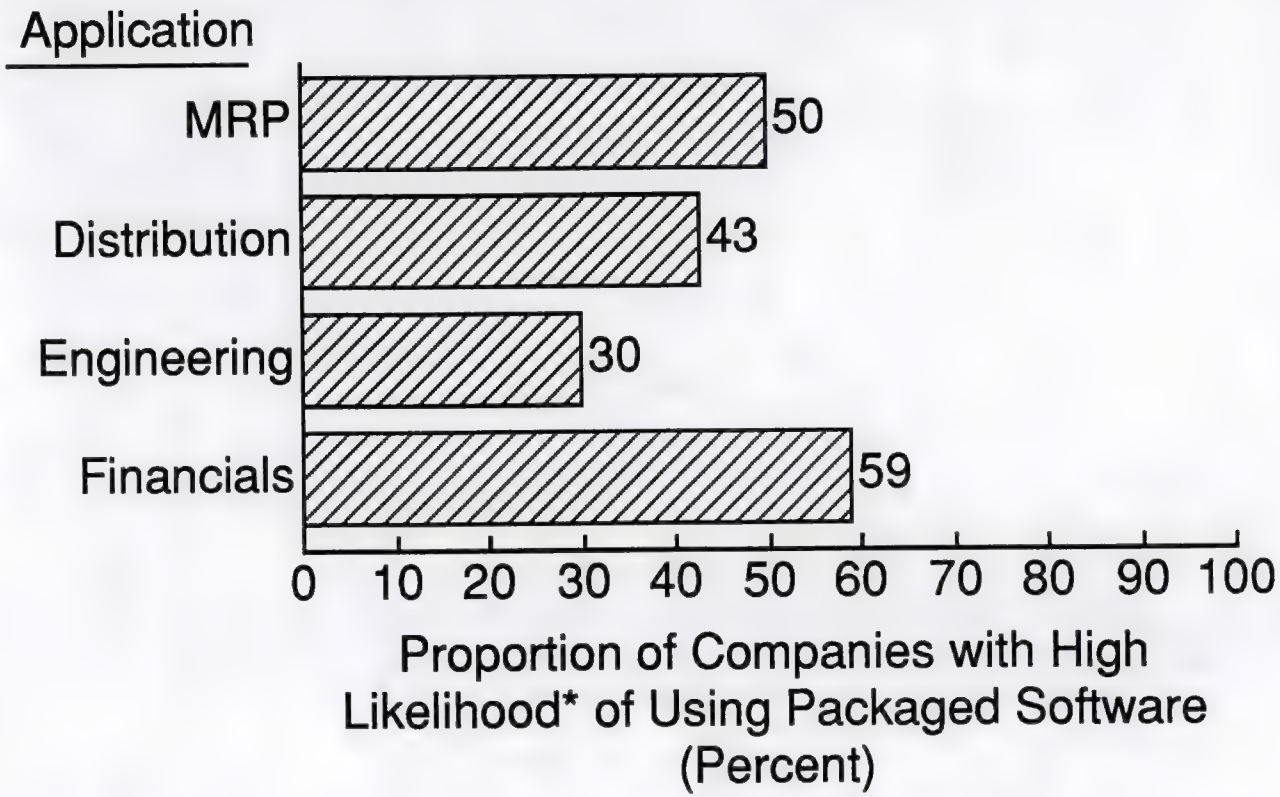
Reasons for Replacement

Percent of Companies Citing	Reasons
20-29%	• Obsolete software; need software upgrade
10-19%	• Effects of changes to underlying business process • Improve technical environment • Improve functionality
Under 10%	• Move to open systems • Downsizing/client-server • Reduce costs • Growth in underlying business

Note: Open-ended answers were classified into the above categories.

Exhibit II-3: Europe

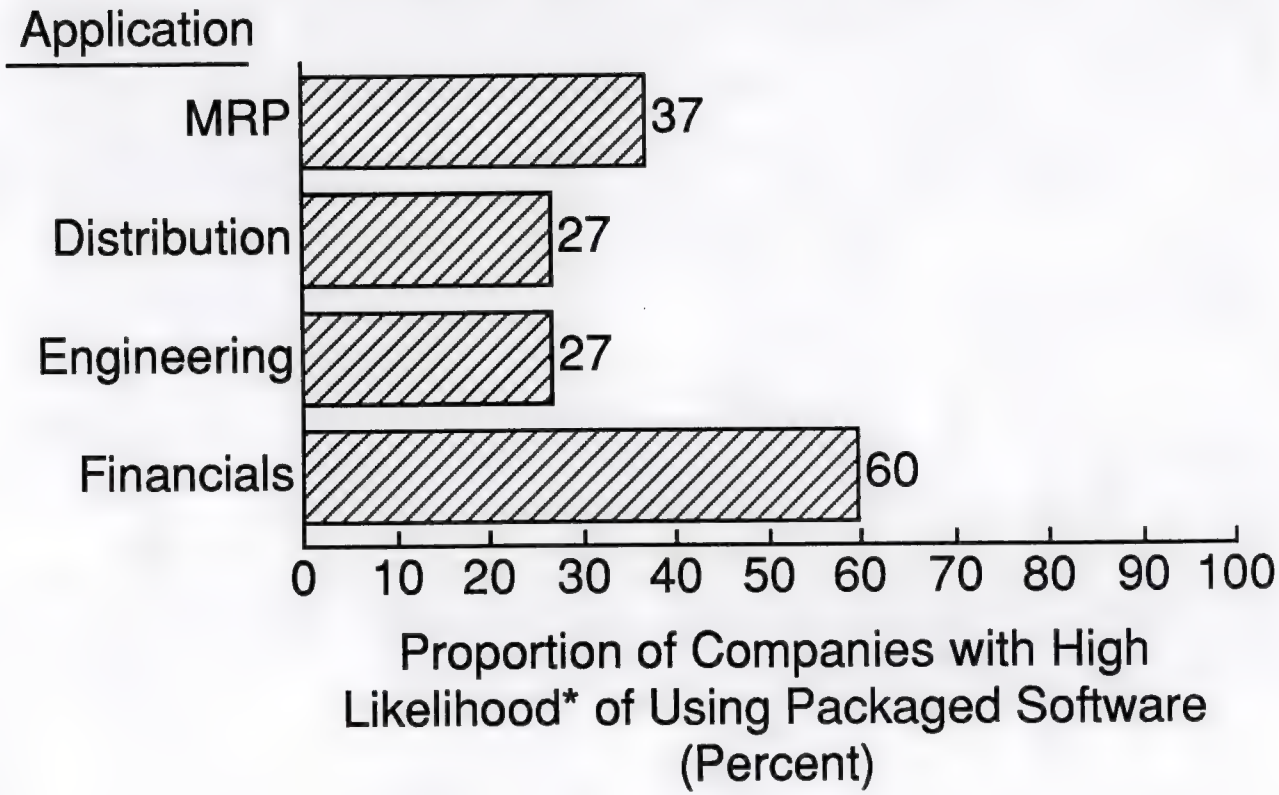
Likelihood of Using Packaged Software in Replacement System



* i.e., Companies giving a probability of using packaged software as 75% or more.

Exhibit II-3a: U.K.

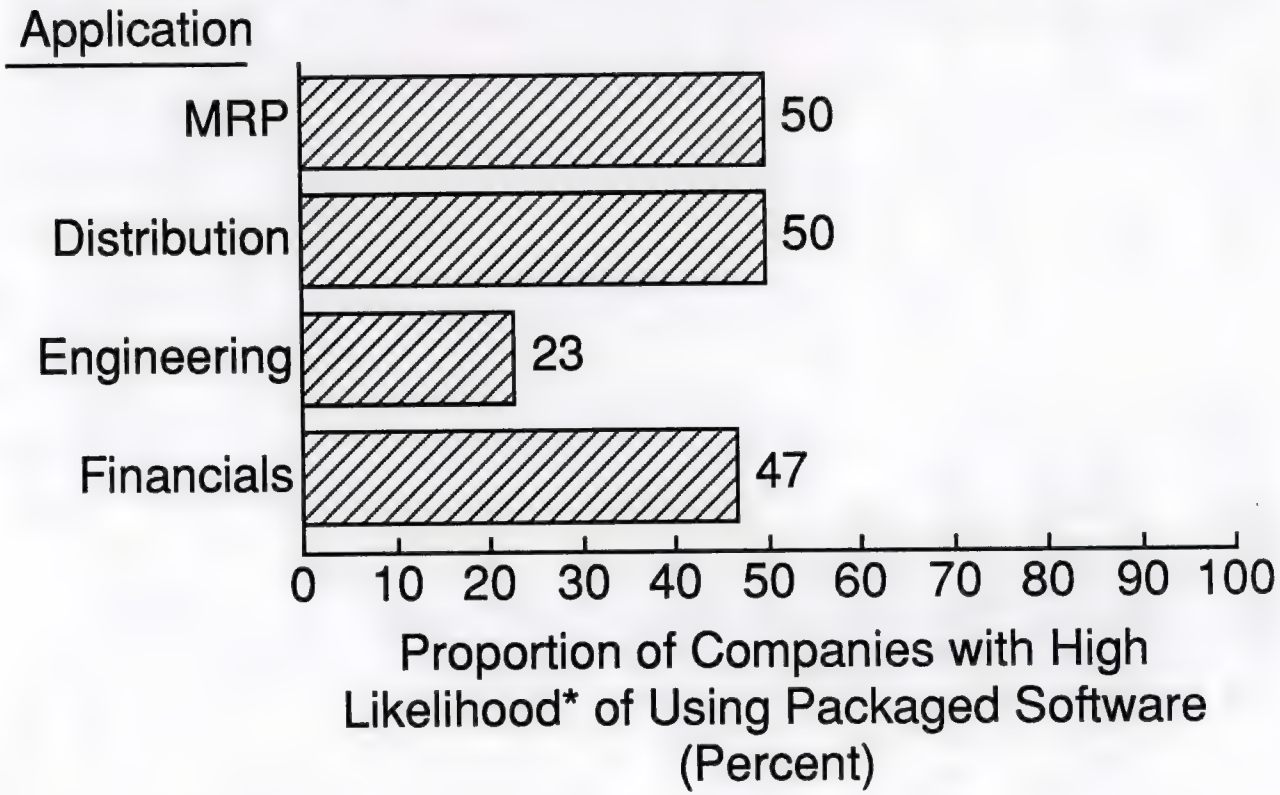
Likelihood of Using Packaged Software in Replacement System



* i.e., Companies giving a probability of using packaged software as 75% or more.

Exhibit II-3b: France

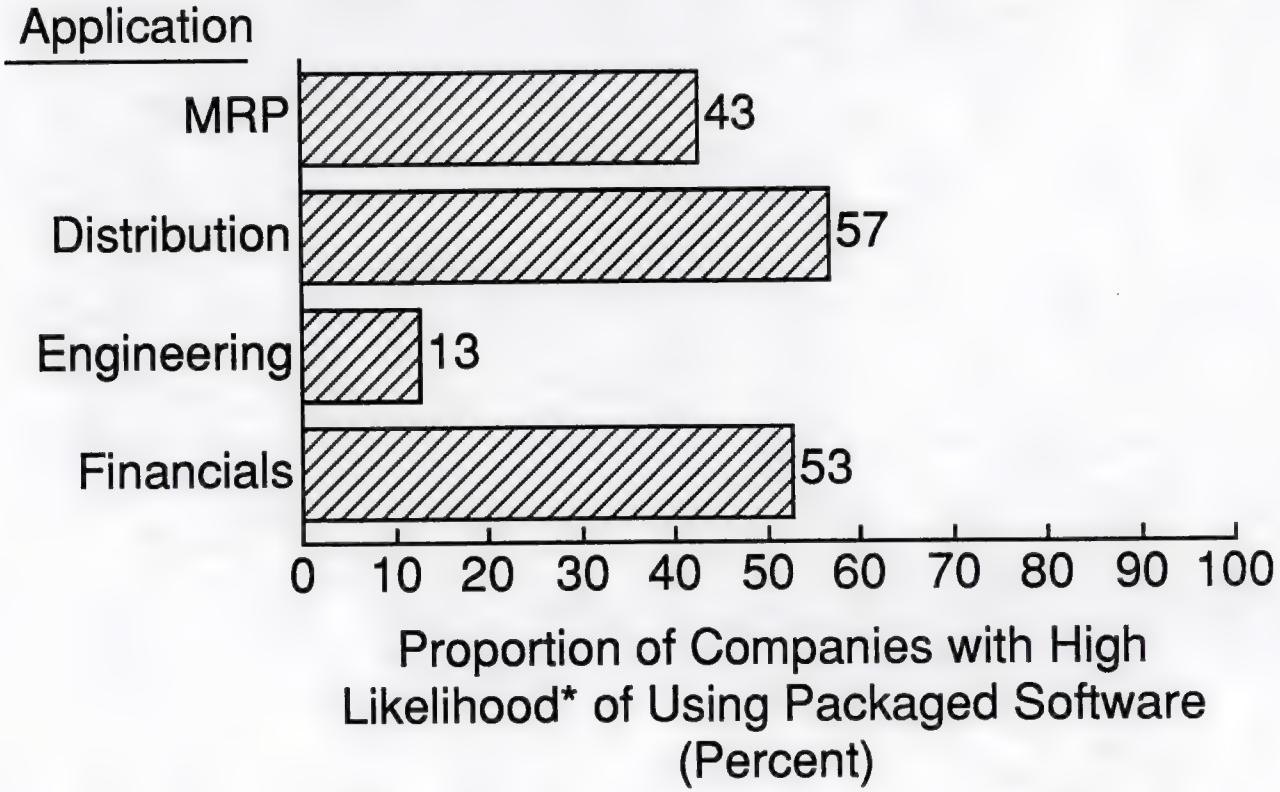
Likelihood of Using Packaged Software in Replacement System



* i.e., Companies giving a probability of using packaged software as 75% or more.

Exhibit II-3c: Germany

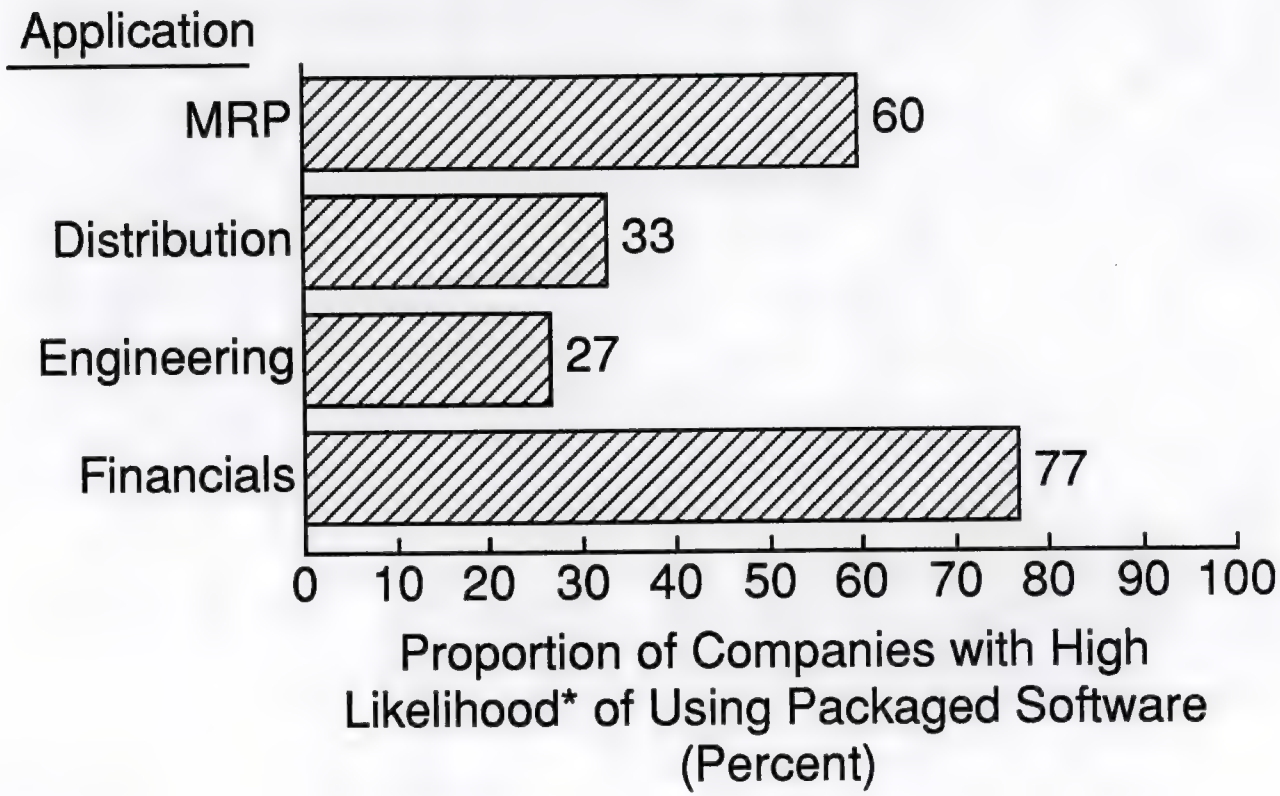
Likelihood of Using Packaged Software in Replacement System



* i.e., Companies giving a probability of using packaged software as 75% or more.

Exhibit II-3d: Benelux

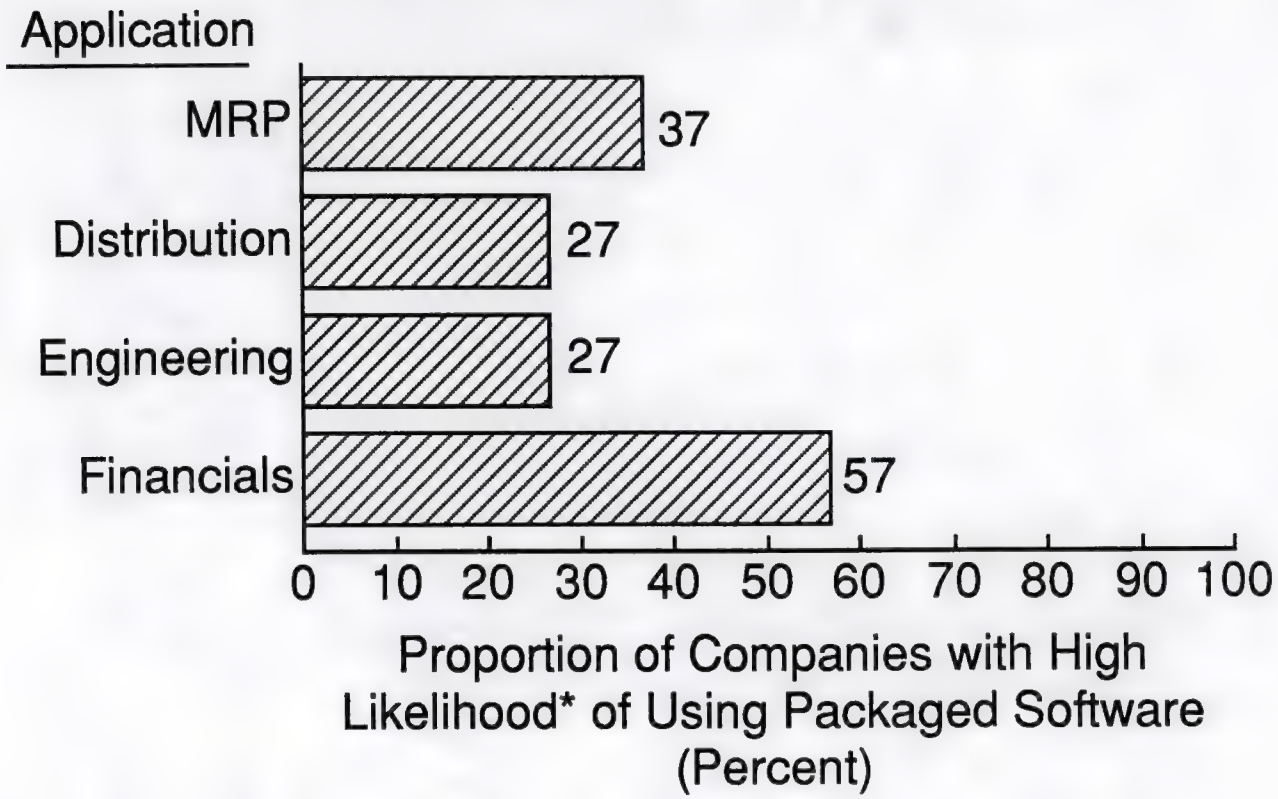
Likelihood of Using Packaged Software in Replacement System



* i.e., Companies giving a probability of using packaged software as 75% or more.

Exhibit II-3e: Spain

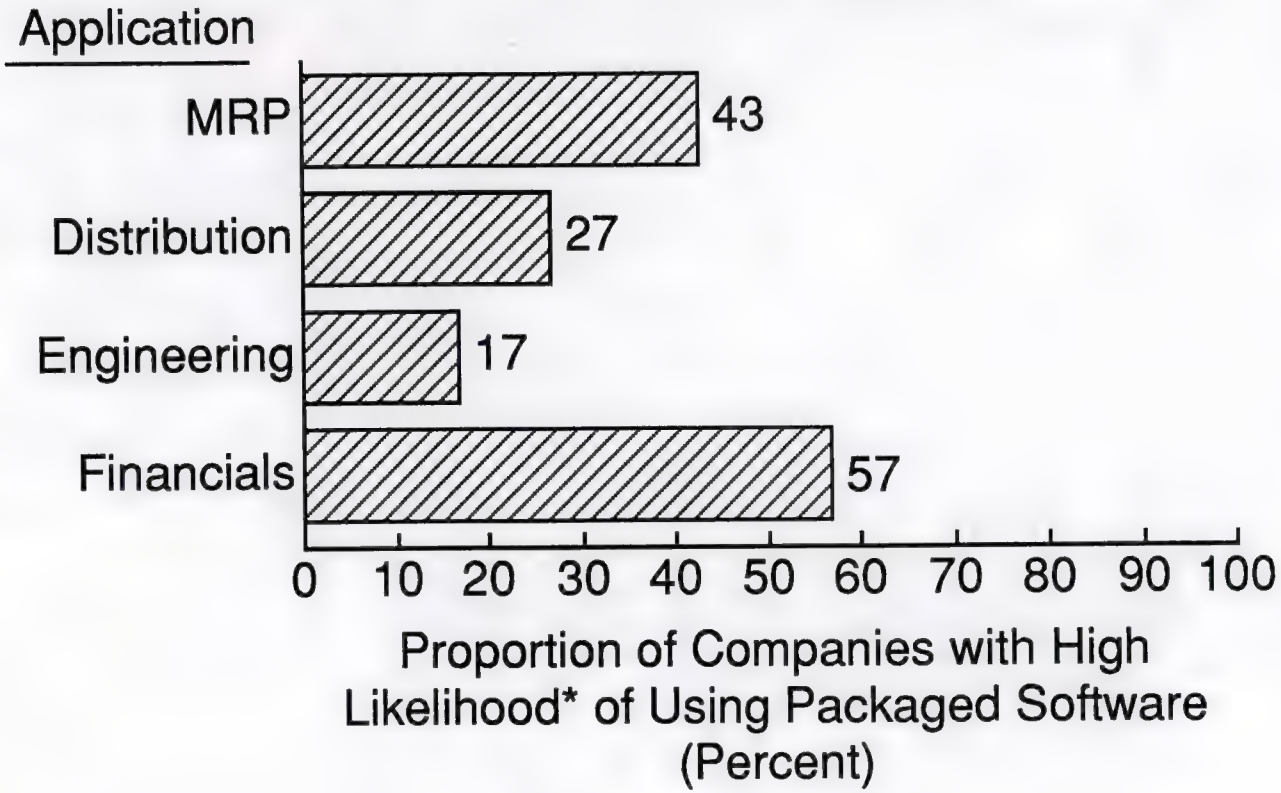
Likelihood of Using Packaged Software in Replacement System



* i.e., Companies giving a probability of using packaged software as 75% or more.

Exhibit II-3f: Italy

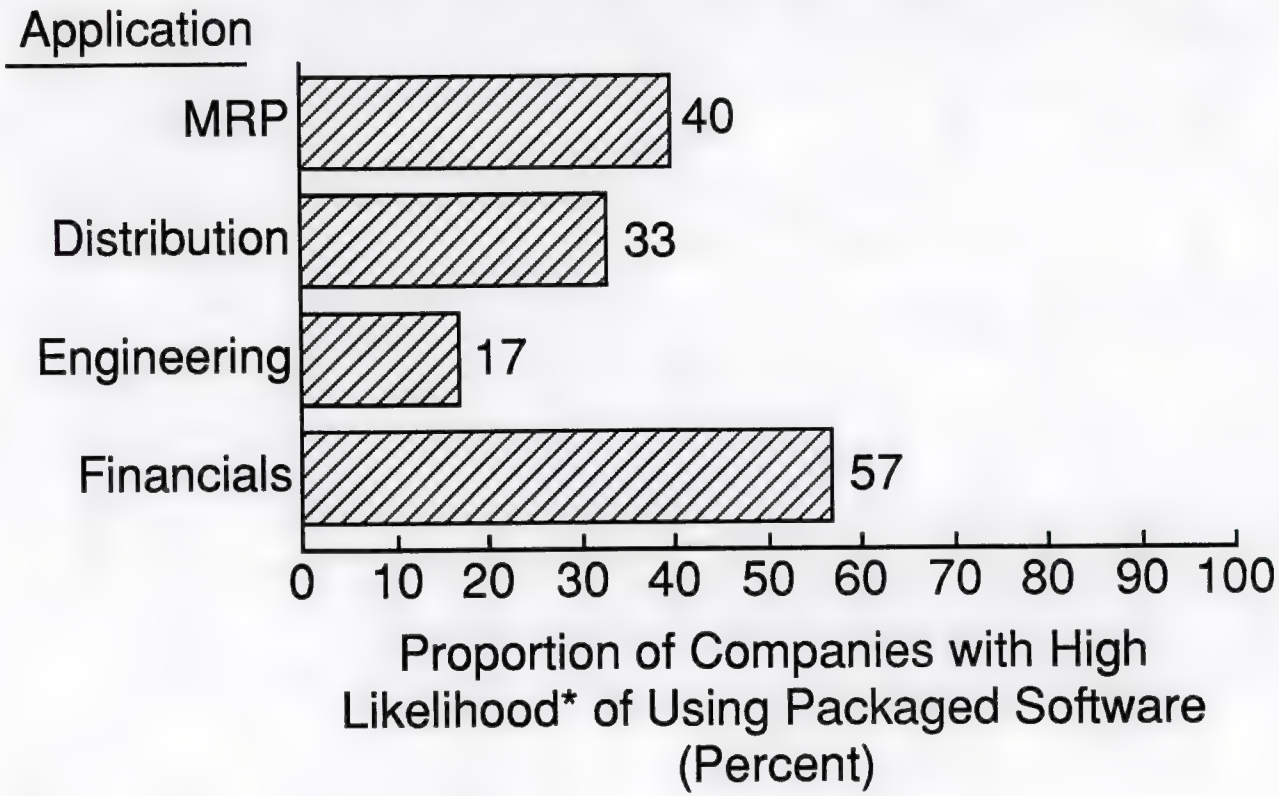
Likelihood of Using Packaged Software in Replacement System



* i.e., Companies giving a probability of using packaged software as 75% or more.

Exhibit II-3g: Sweden

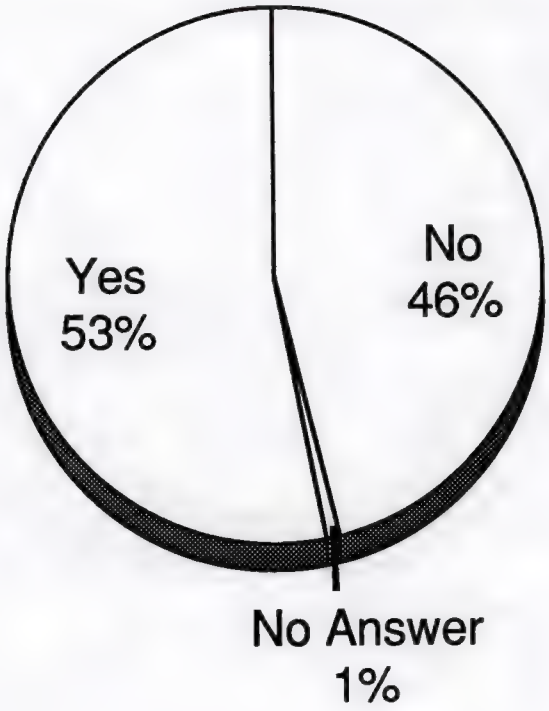
Likelihood of Using Packaged Software in Replacement System



* i.e., Companies giving a probability of using packaged software as 75% or more.

Exhibit II-4: Europe

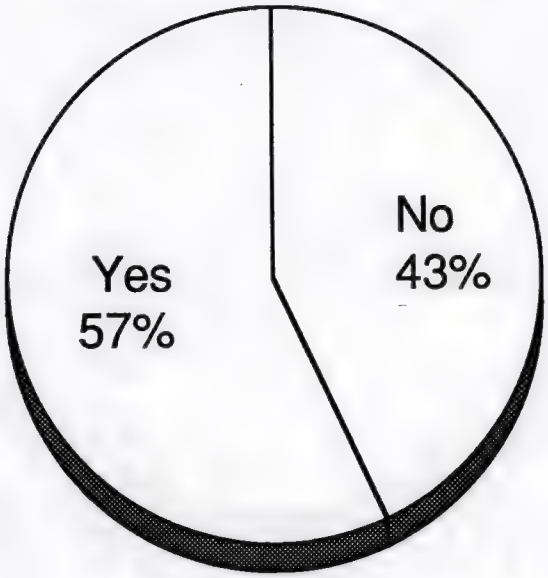
Currently Evaluating Manufacturing Software Package(s)



Number of Respondents = 211

Exhibit II-4a: U.K.

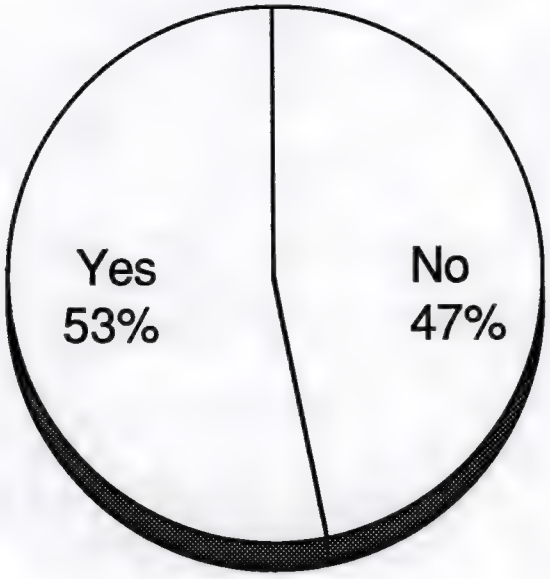
Currently Evaluating Manufacturing Software Package(s)



Number of Respondents = 30

Exhibit II-4b: France

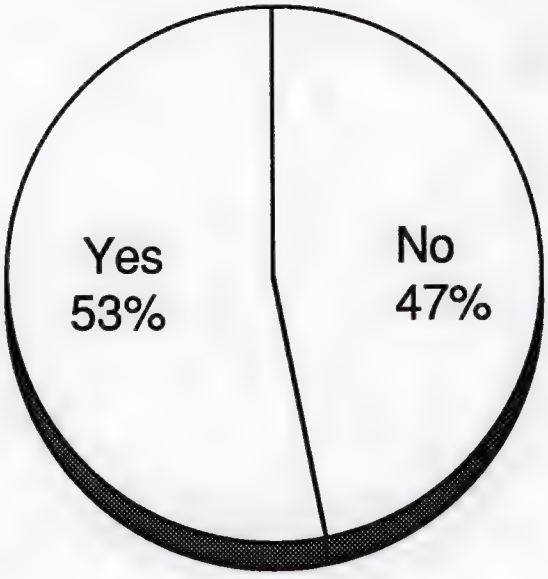
Currently Evaluating Manufacturing Software Package(s)



Number of Respondents = 30

Exhibit II-4c: Germany

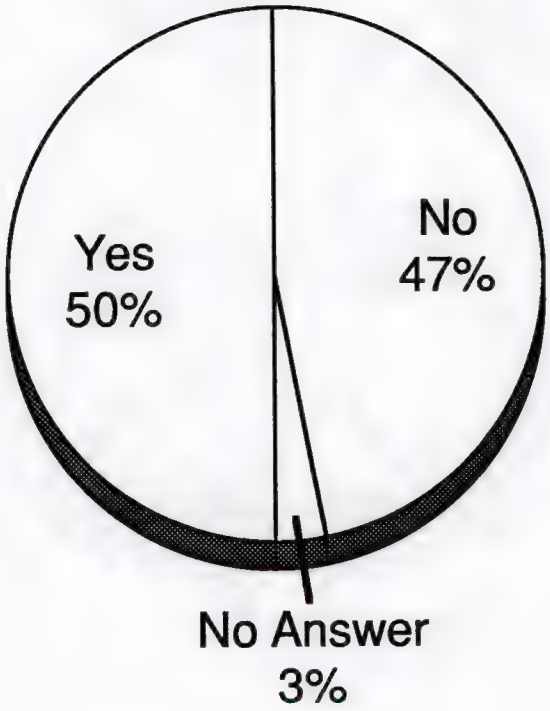
Currently Evaluating Manufacturing Software Package(s)



Number of Respondents = 30

Exhibit II-4d: Benelux

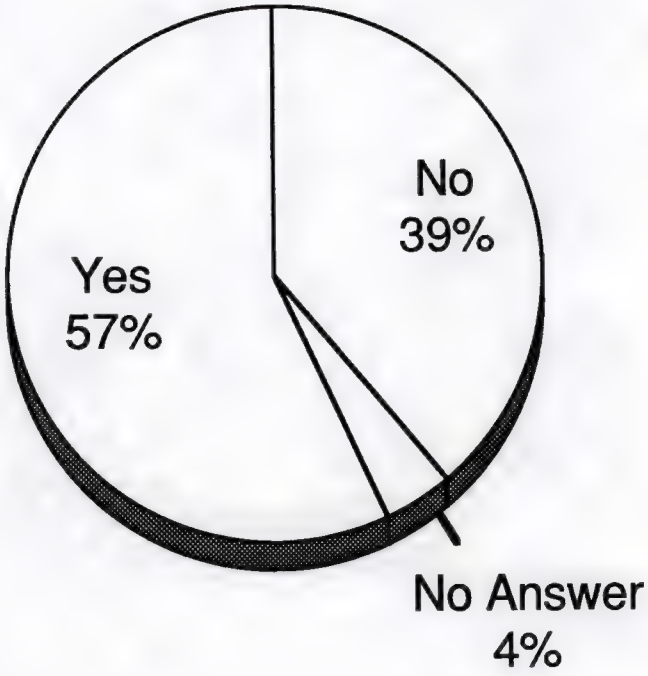
Currently Evaluating Manufacturing Software Package(s)



Number of Respondents = 30

Exhibit II-4e: Spain

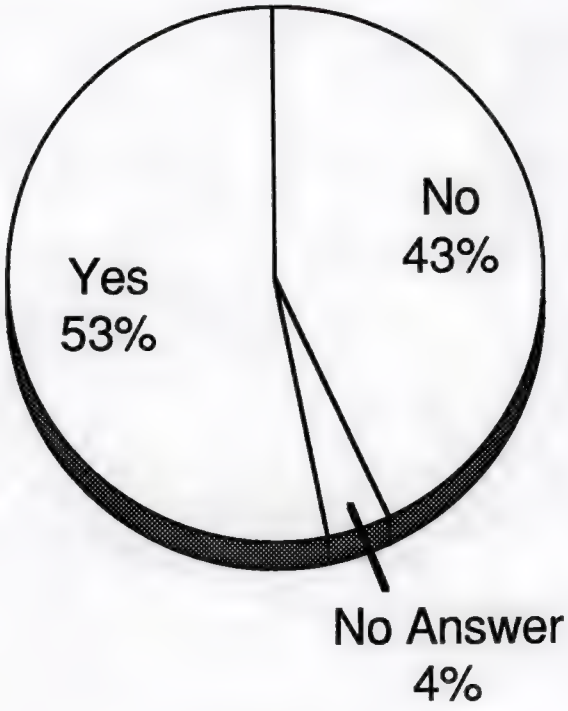
Currently Evaluating Manufacturing Software Package(s)



Number of Respondents = 30

Exhibit II-4f: Italy

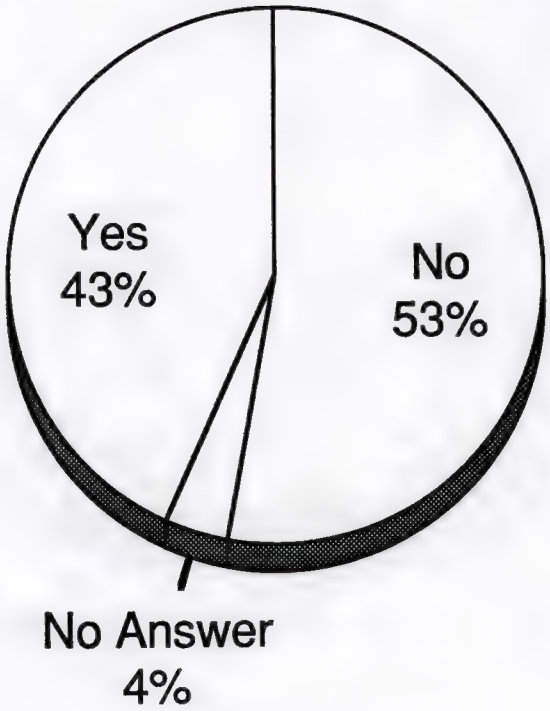
Currently Evaluating Manufacturing Software Package(s)



Number of Respondents = 30

Exhibit II-4g: Sweden

Currently Evaluating Manufacturing Software Package(s)



Number of Respondents = 30

Exhibit II-5

Specific Manufacturing-Related Software Packages Being Evaluated

(If named by more than one company, number of companies shown in parentheses.)

ADDX
Airial (4)
Almandes
ASSIST
Autocad (2)
BPECS (7)
Bruckner (2)
CADPlus
Chameleon (2)
Compass
Computer 2000
Computer Aackon
Computer Associates
CSC (2)
Decisco (3)
EDIST (2)
EDS
Enidata
Eperge (2)
ESCOM
FAM (4)
Hauser
Homzon
IBF (2)
IBIX
IBS

Exhibit II-5 (Cont.)

Specific Manufacturing-Related Software Packages Being Evaluated

(If named by more than one company, number of companies shown in parentheses.)

Inducom (2)
J.D. Edwards (2)
JBA (7)
Lambra Gestion
Marcam (2)
MAX (2)
Mentec
Mikodata
MIMS
Movex (2)
Open Comet
Oracle Financials (5)
Orthos
Praxys
Proctor (2)
Proton (2)
SAP (9)
SIFI (3)
Spectra (2)
Sun Accounts
Svim
Triton
Turistel

Exhibit II-6

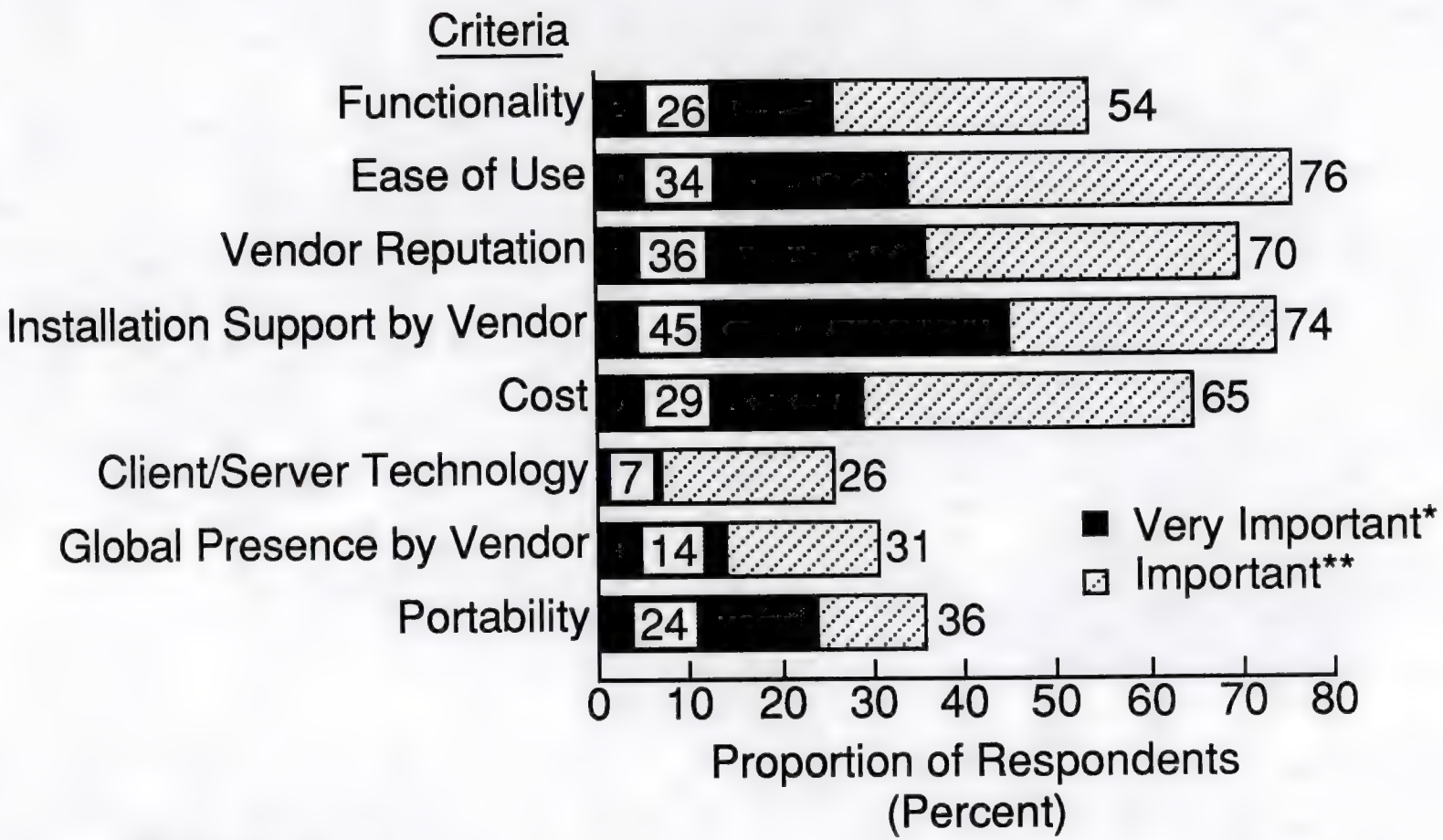
Hardware/Operating Environments Now Being Considered for New Applications in Europe

Environments	Percent of Companies *
Proprietary Platforms MVS 3% AS/400 27% VAX 7% Other 5%	41
UNIX RS6000 4% HP 11% Sun 4% DEC 8% Other 8% Not identified 15%	45
Intel OS/2, Windows 3% DOS 10% UNIX 3%	16
Other (Mainly Windows NT)	2
Not specified	9

* Note: Totals more than 100% due to multiple evaluations.

Exhibit III-1: Europe

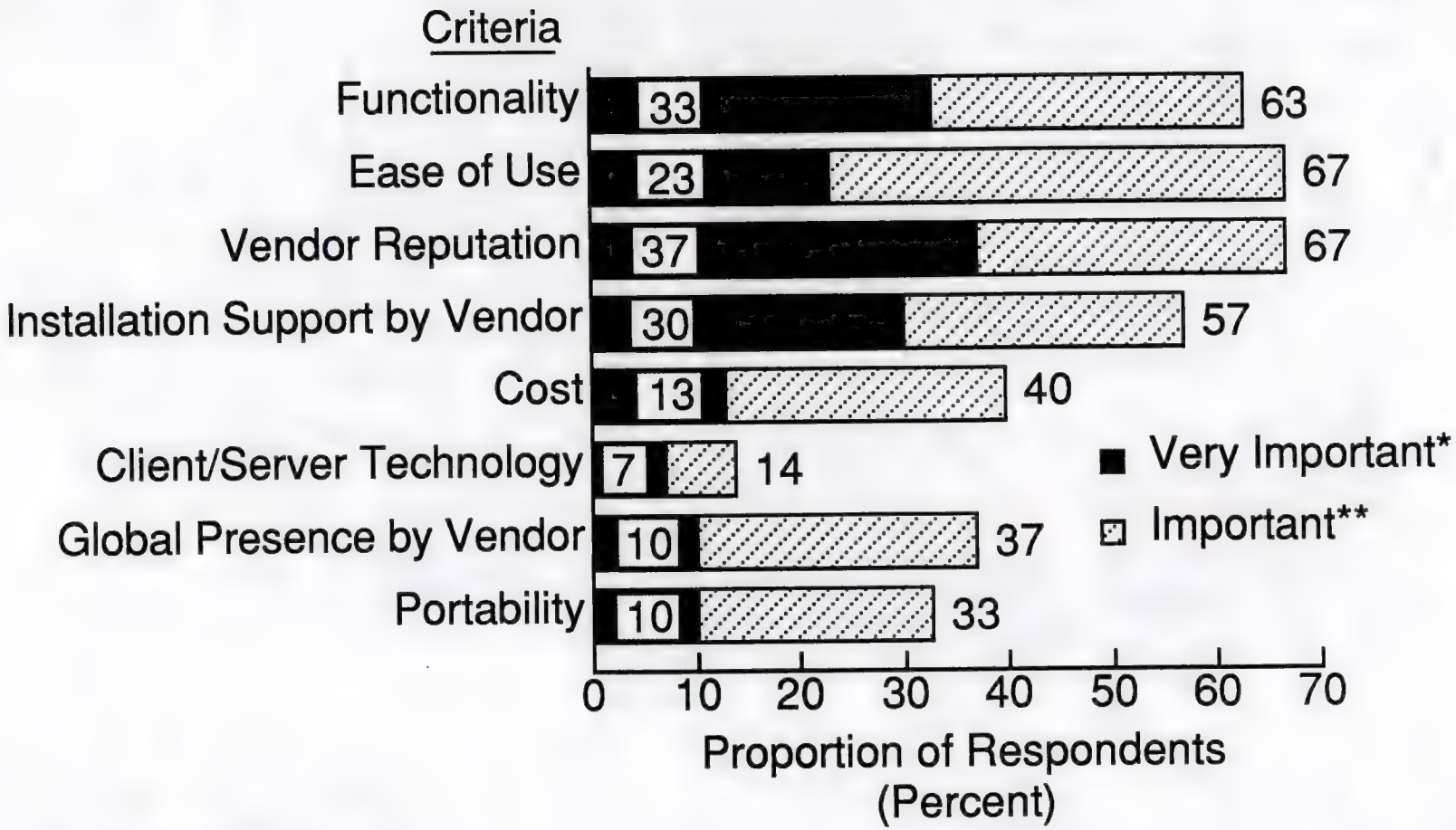
Manufacturing Package Selection Criteria



* 5 on a scale of 1 to 5
** 4 or 5 on a scale of 1 to 5

Exhibit III-1a: U.K.

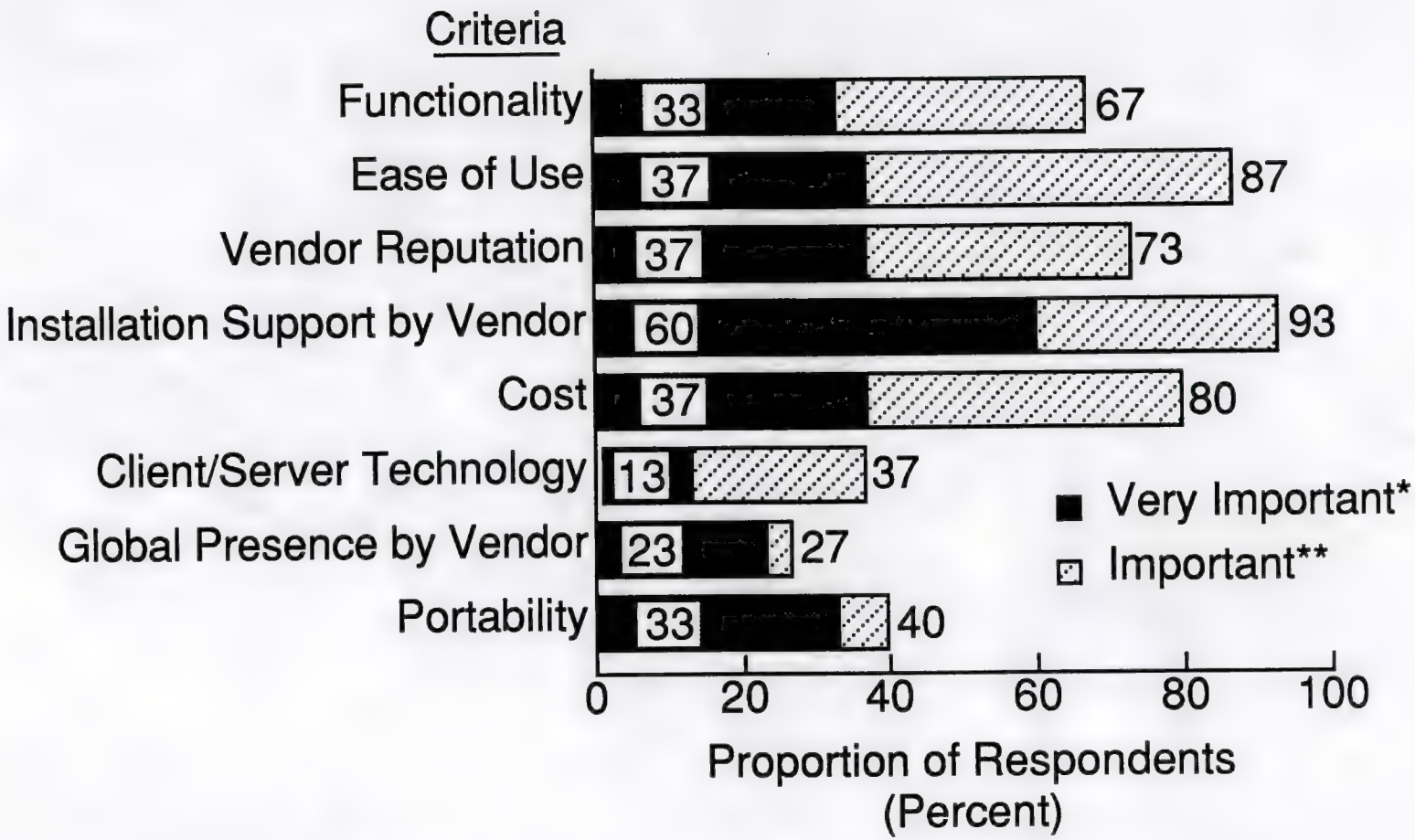
Manufacturing Package Selection Criteria



* 5 on a scale of 1 to 5
** 4 or 5 on a scale of 1 to 5

Exhibit III-1b: France

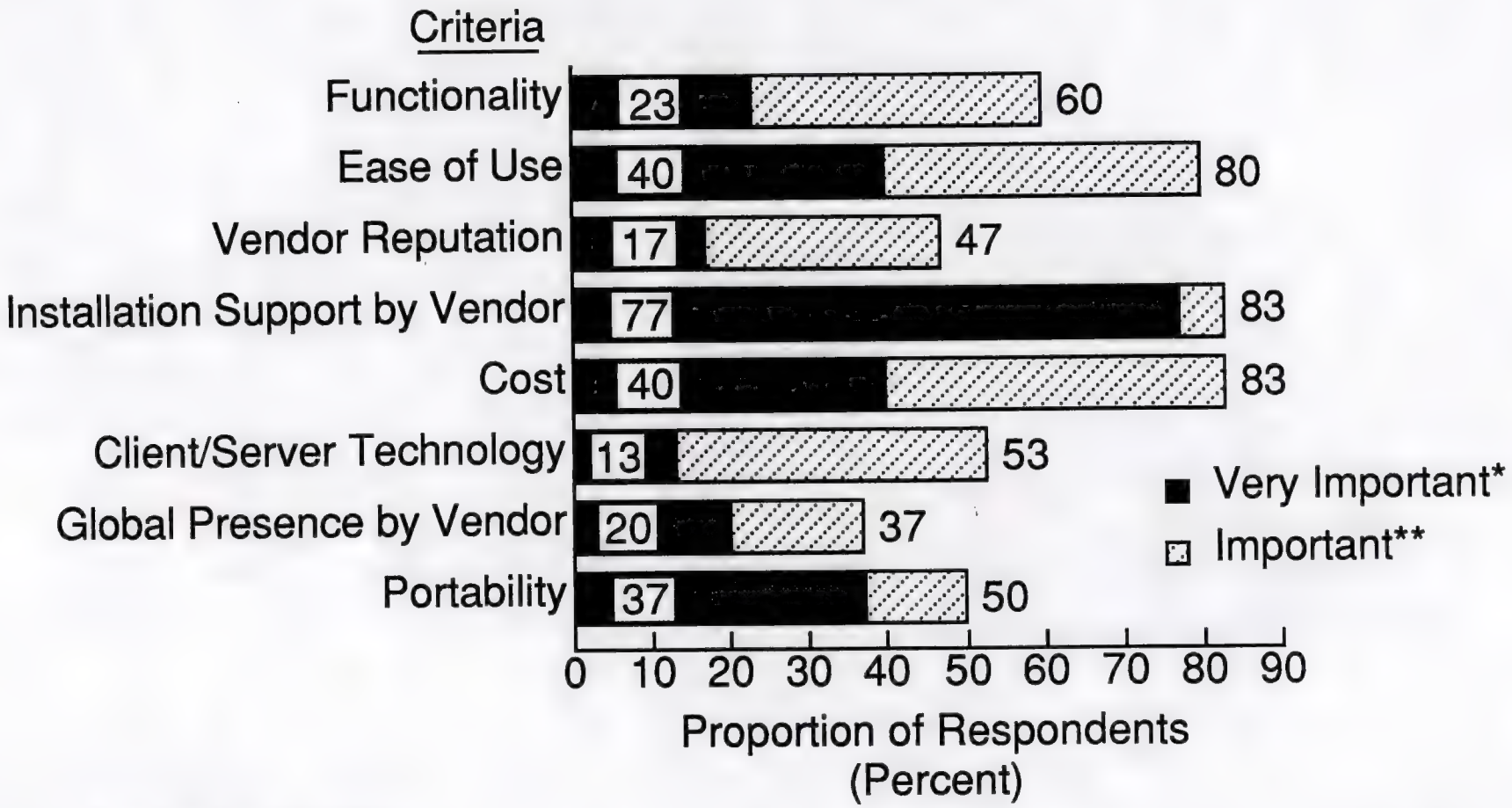
Manufacturing Package Selection Criteria



* 5 on a scale of 1 to 5
** 4 or 5 on a scale of 1 to 5

Exhibit III-1c: Germany

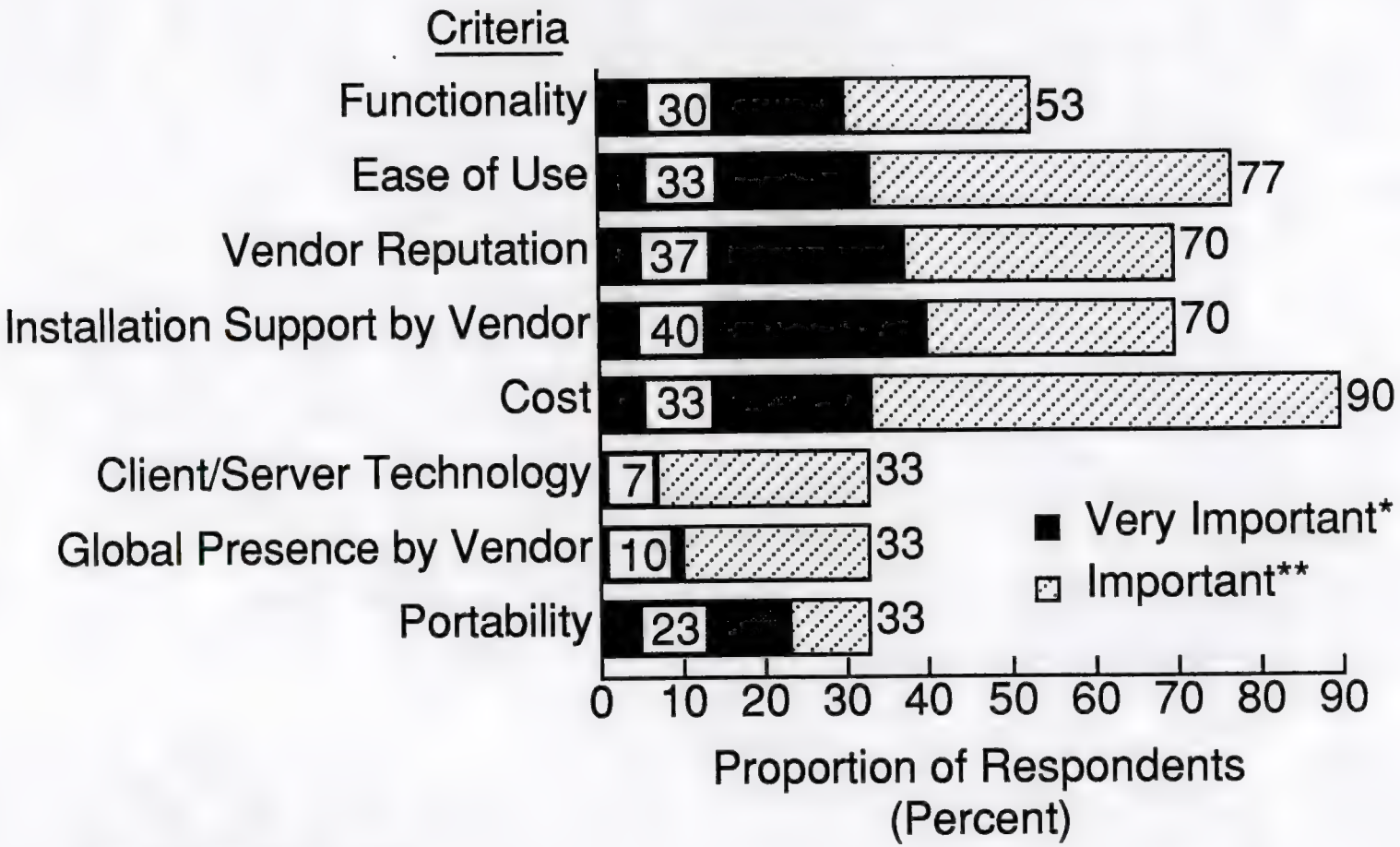
Manufacturing Package Selection Criteria



* 5 on a scale of 1 to 5
** 4 or 5 on a scale of 1 to 5

Exhibit III-1d: Benelux

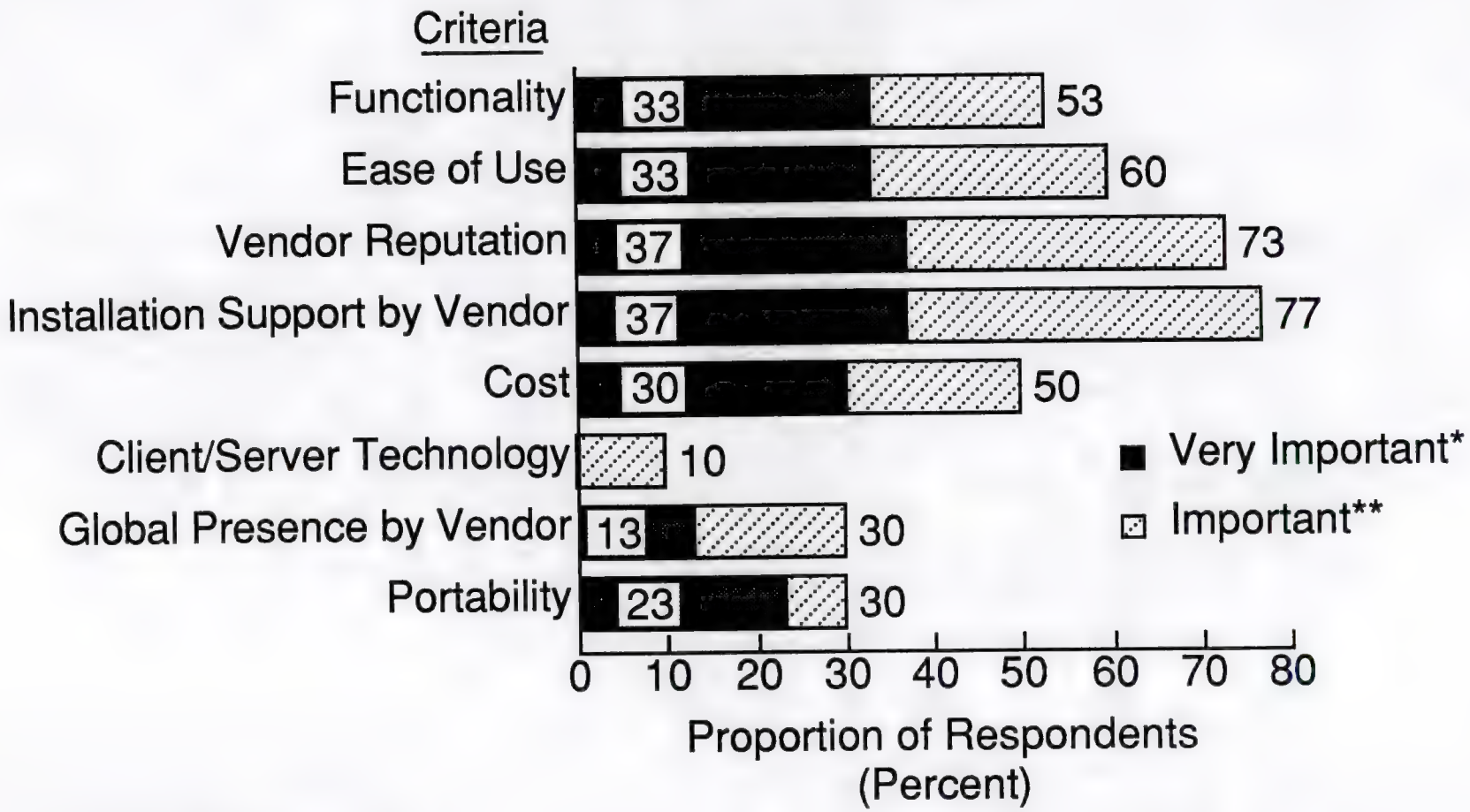
Manufacturing Package Selection Criteria



* 5 on a scale of 1 to 5
** 4 or 5 on a scale of 1 to 5

Exhibit III-1e: Spain

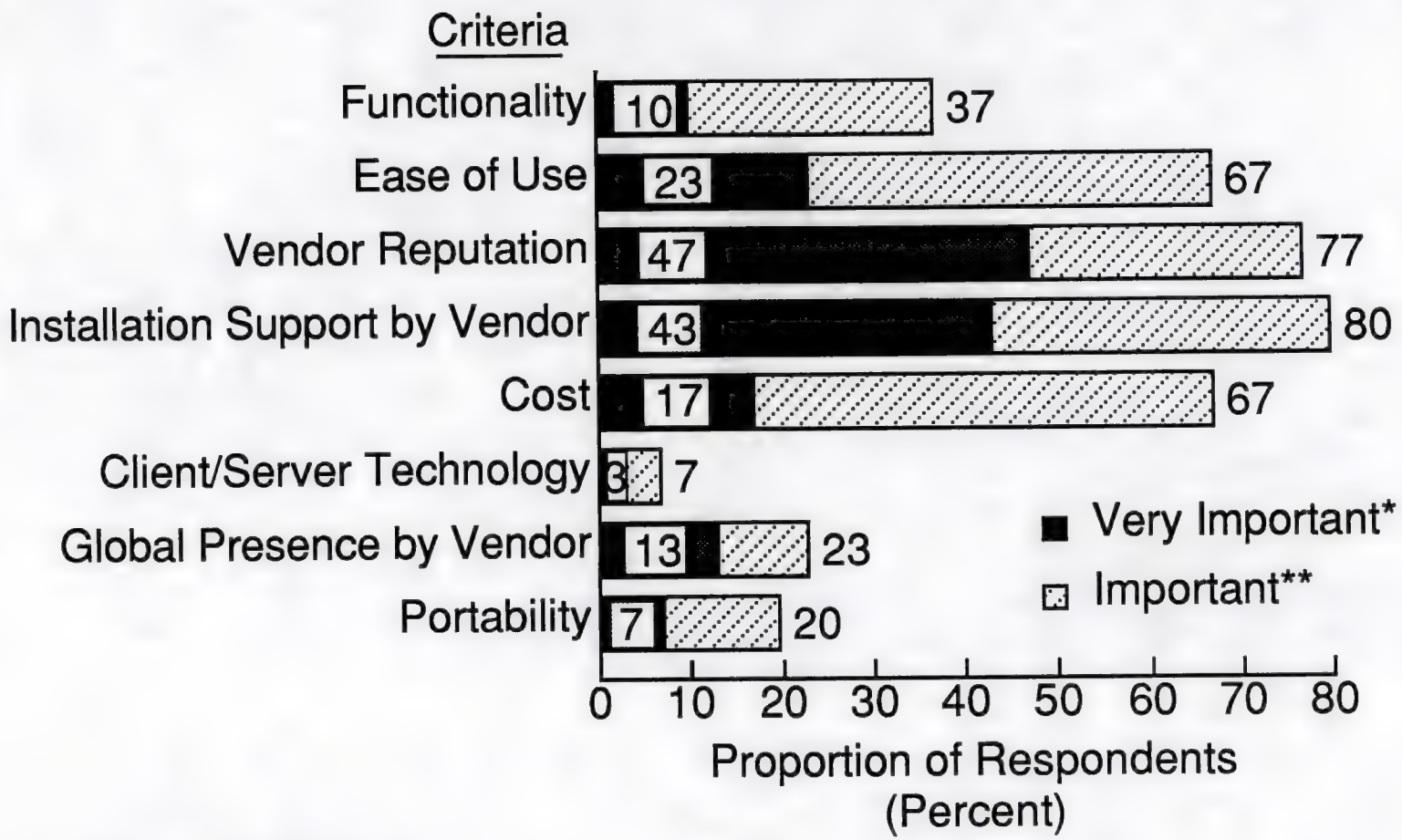
Manufacturing Package Selection Criteria



* 5 on a scale of 1 to 5
** 4 or 5 on a scale of 1 to 5

Exhibit III-1f: Italy

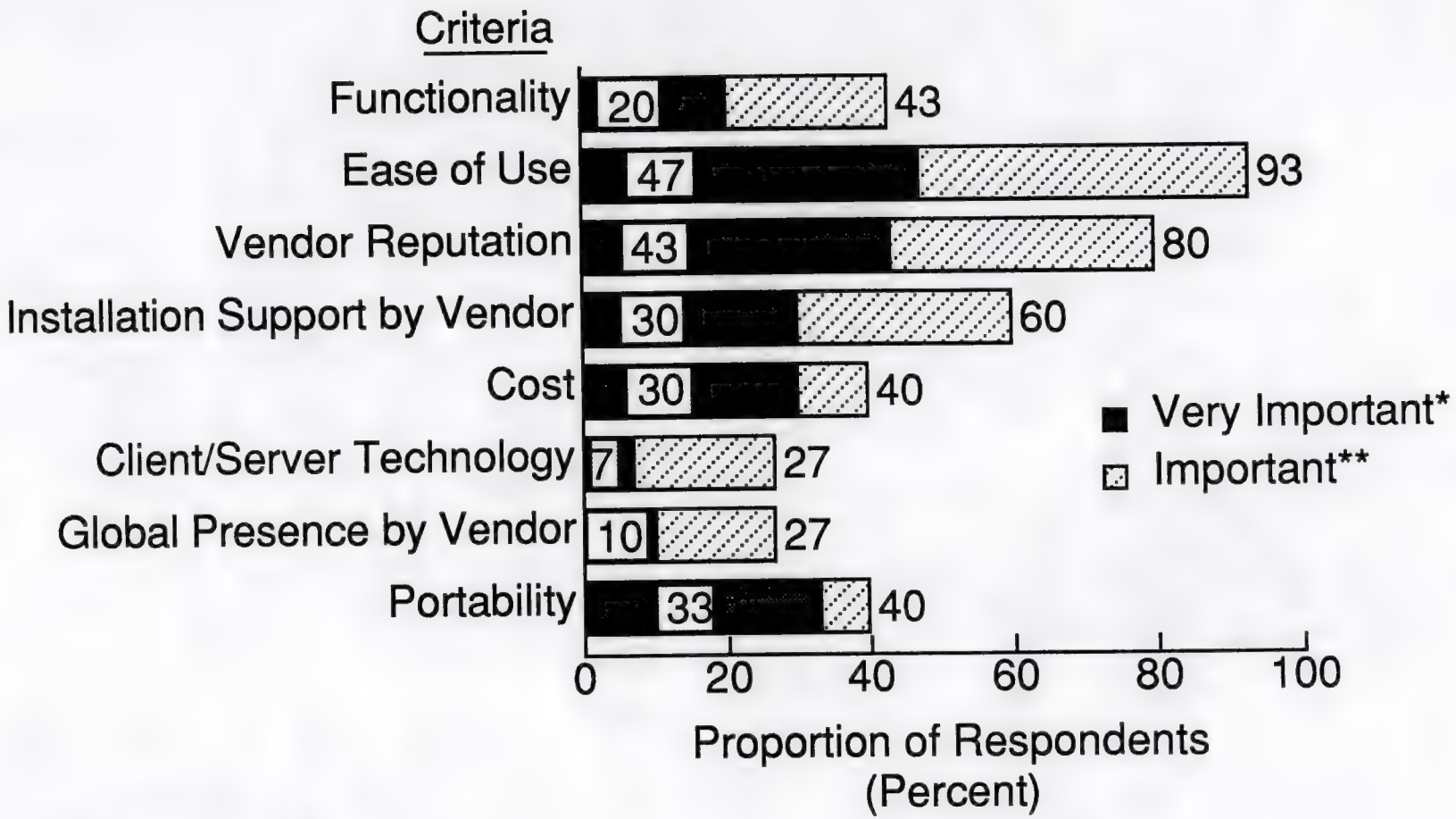
Manufacturing Package Selection Criteria



* 5 on a scale of 1 to 5
** 4 or 5 on a scale of 1 to 5

Exhibit III-1g: Sweden

Manufacturing Package Selection Criteria



* 5 on a scale of 1 to 5
** 4 or 5 on a scale of 1 to 5

Exhibit III-2: Europe

Customer Advice on What the Next Generation of Manufacturing Software Should Include

- True real time integration
- Convergence of all open systems
- Easier report writing functions
- Adopt object-oriented techniques
- Improve implementation time
- Optional features are too flexible now -- confuse the inexperienced
- Easier paper workflow
- Keep it simple
- Better integration between financial and manufacturing systems
- Understand the user's business needs
- Stronger client/server offerings
- Ability to run on any UNIX platform

Exhibit III-2: Europe (Cont.)

Customer Advice on What the Next Generation of Manufacturing Software Should Include

- Operating system convergence
- Improved open system compatibility
- Integration with all third party financial systems
- Better access services in a multivendor environment
- Develop applications with consistent windows, icons, etc.
- Better backup and security
- True platform independence
- Better third party software
- Screen-oriented reports
- Improved systems integration
- Better integration between vendors
- Integrate applications with 4GL

Exhibit III-2: Europe (Cont.)

Customer Advice on What the Next Generation of Manufacturing Software Should Include

- Improve operational efficiency of software
- Total integration between report generators and 4GLs
- Better real time integration
- Software consistency across operating systems
- Real time integration (not batch)
- Common operating environment
- Easier integration with third party products
- Spend more time on the factory floor
- Real time integration between manufacturing and financials

Exhibit IV-1: Europe

Ratings of Operating Environments: 1994 & 1996

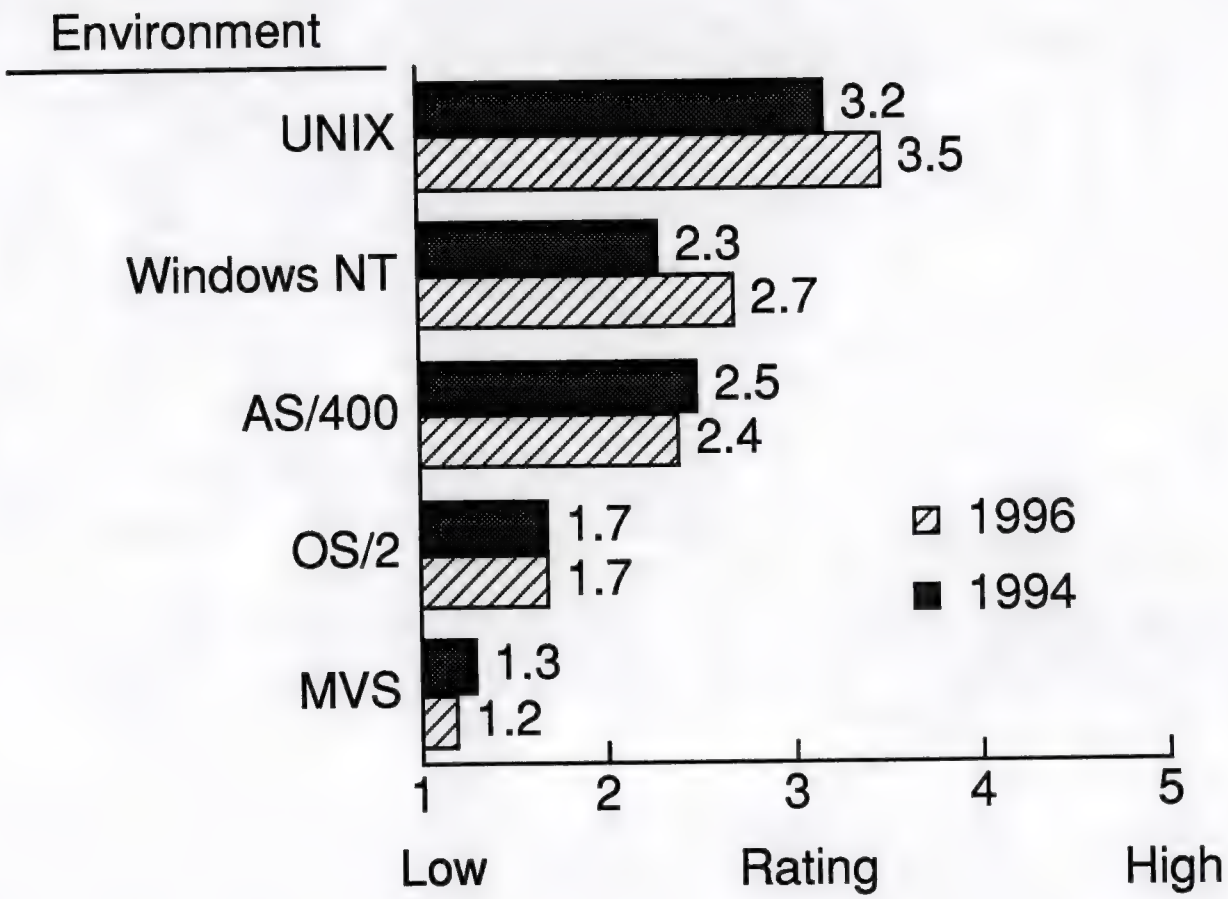


Exhibit IV-1a: U.K.

Ratings of Operating Environments: 1994 & 1996

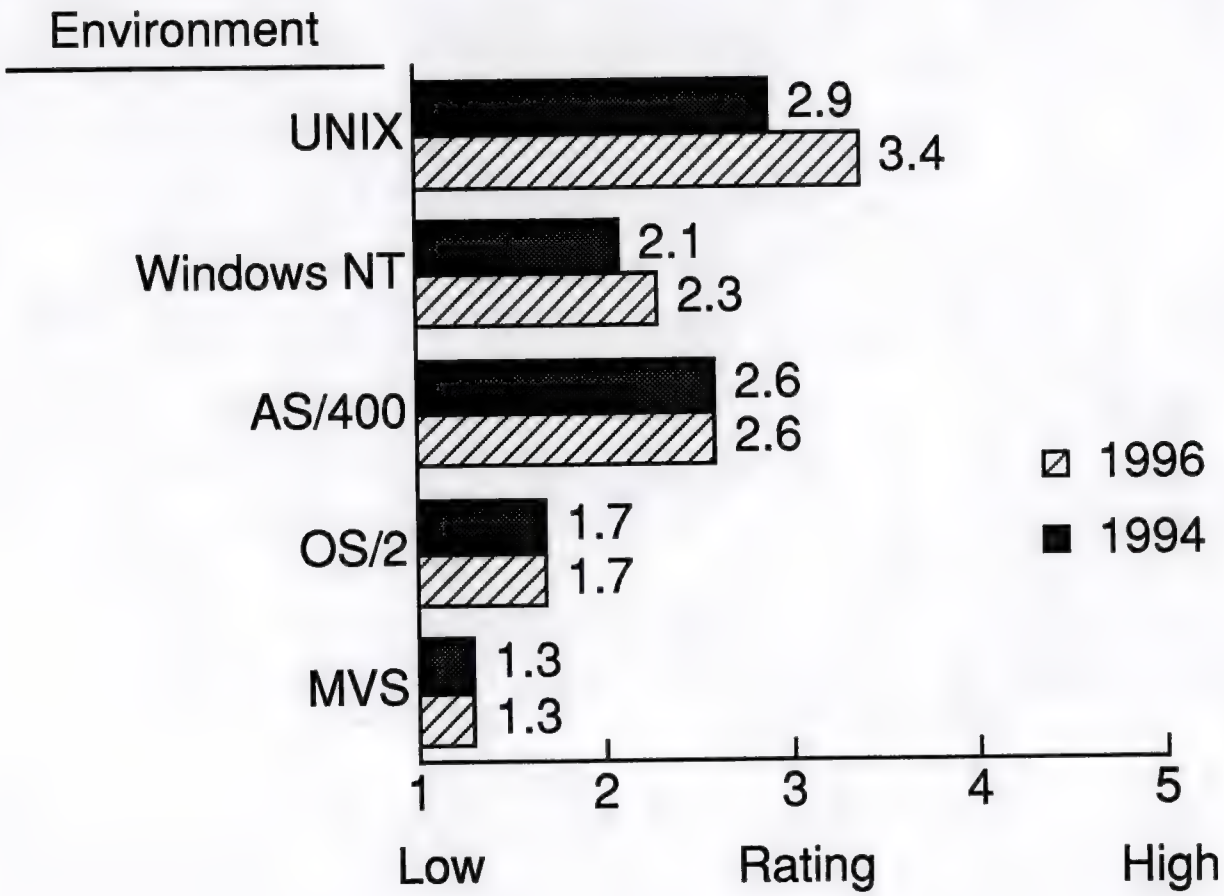


Exhibit IV-1b: France

Ratings of Operating Environments: 1994 & 1996

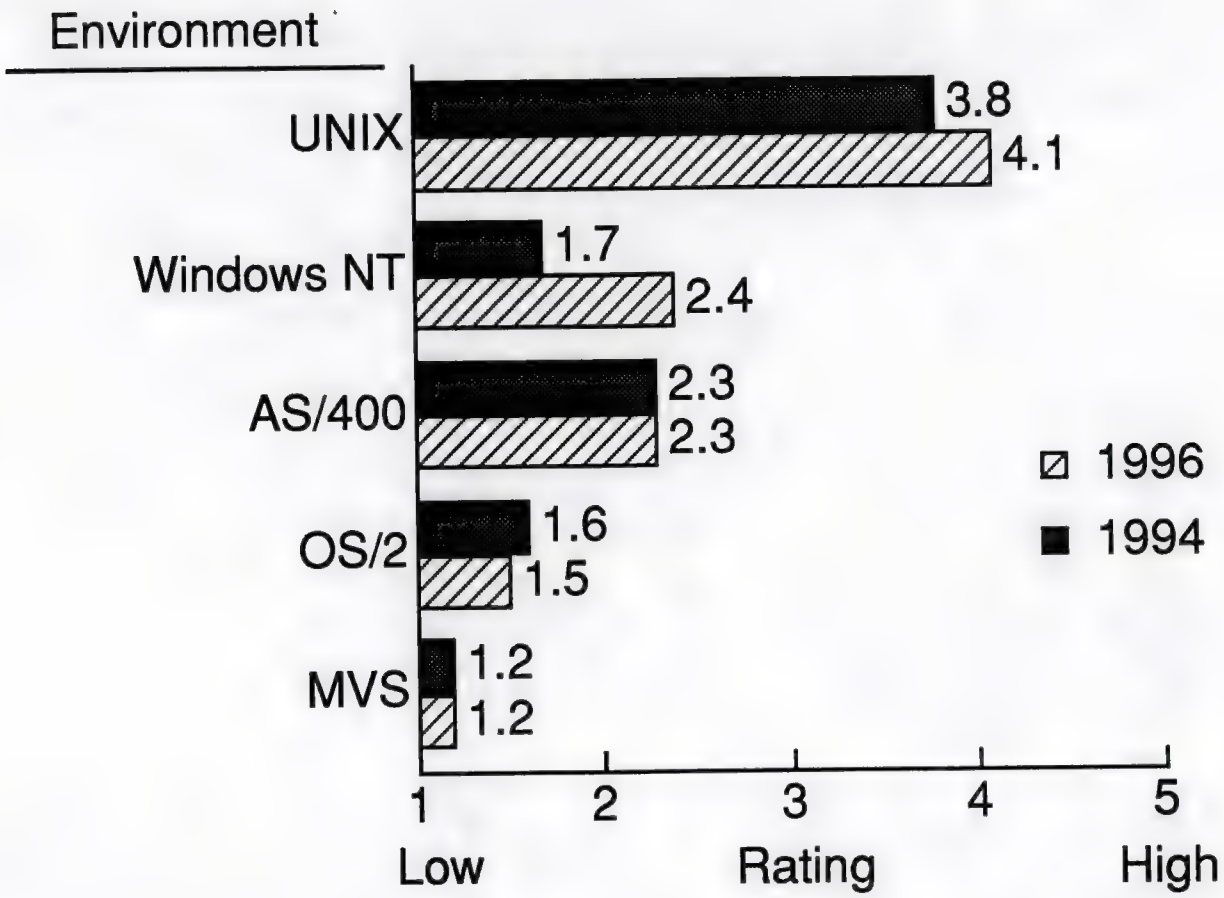


Exhibit IV-1c: Germany

Ratings of Operating Environments: 1994 & 1996

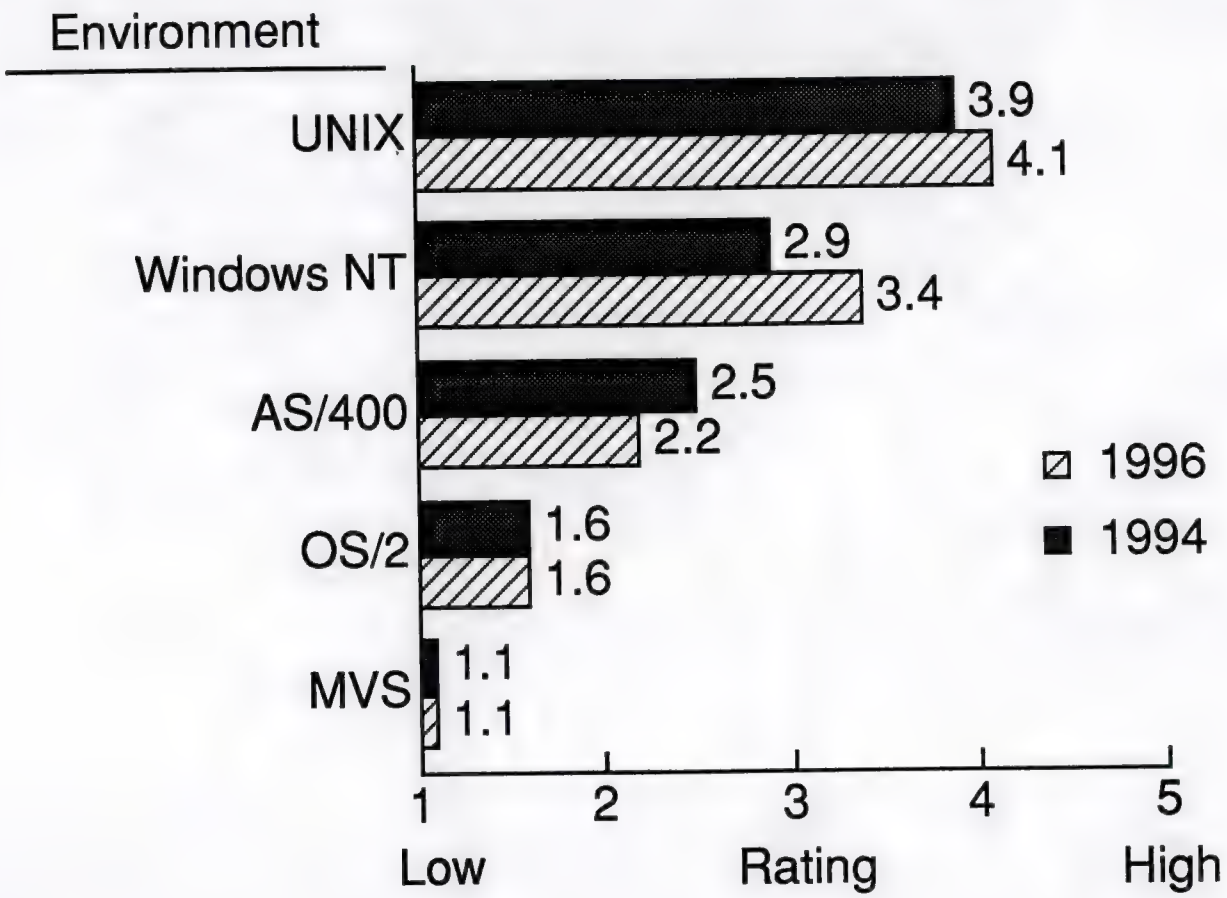
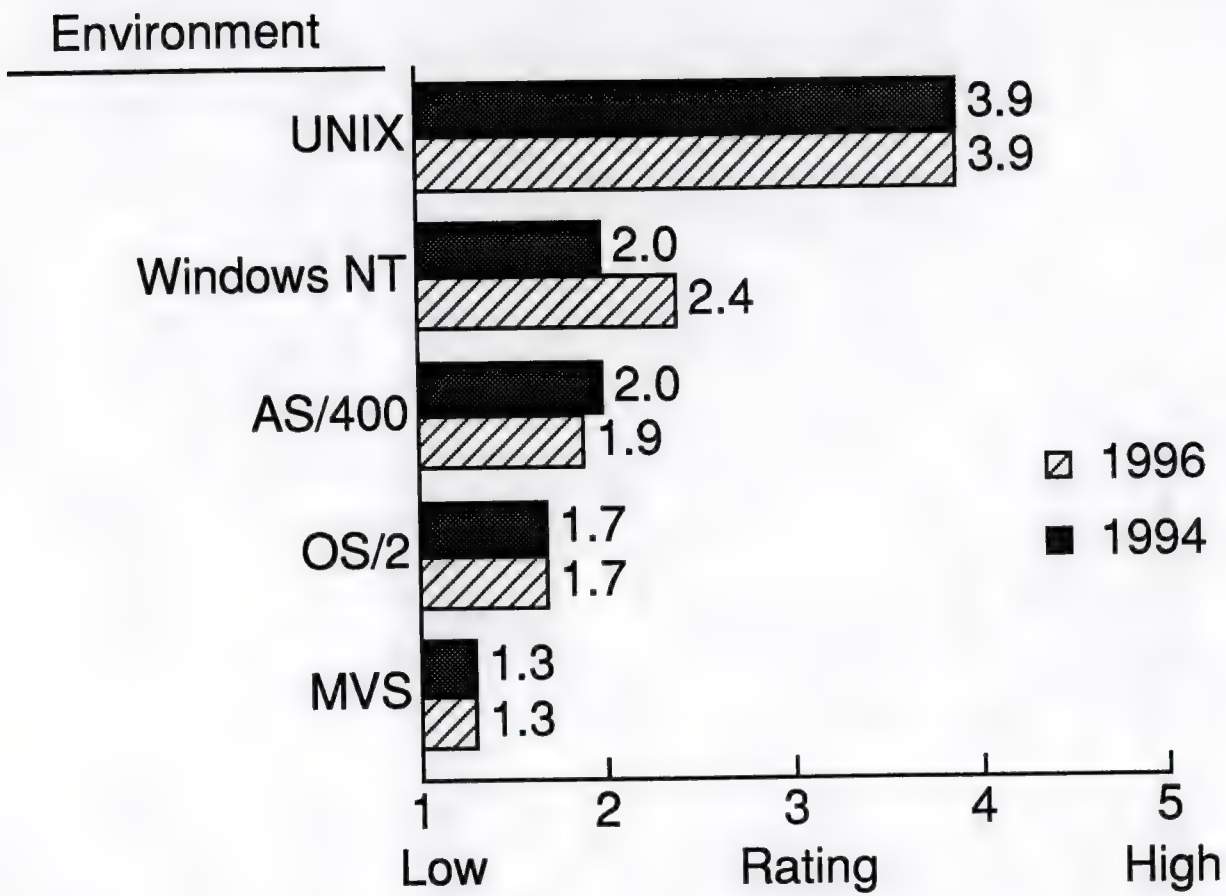


Exhibit IV-1d: Benelux

Ratings of Operating Environments: 1994 & 1996



INPUT

Exhibit IV-1e: Spain

Ratings of Operating Environments: 1994 & 1996

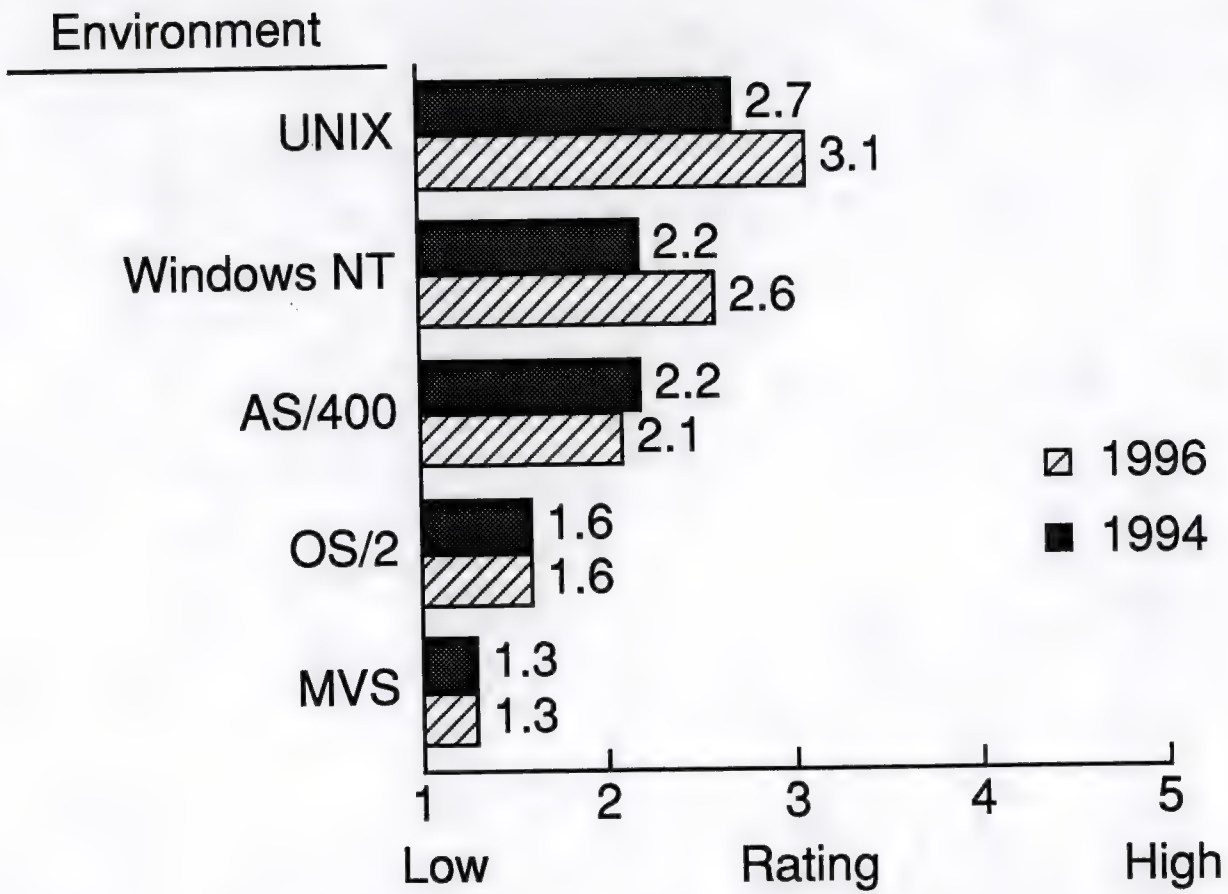


Exhibit IV-1f: Italy

Ratings of Operating Environments: 1994 & 1996

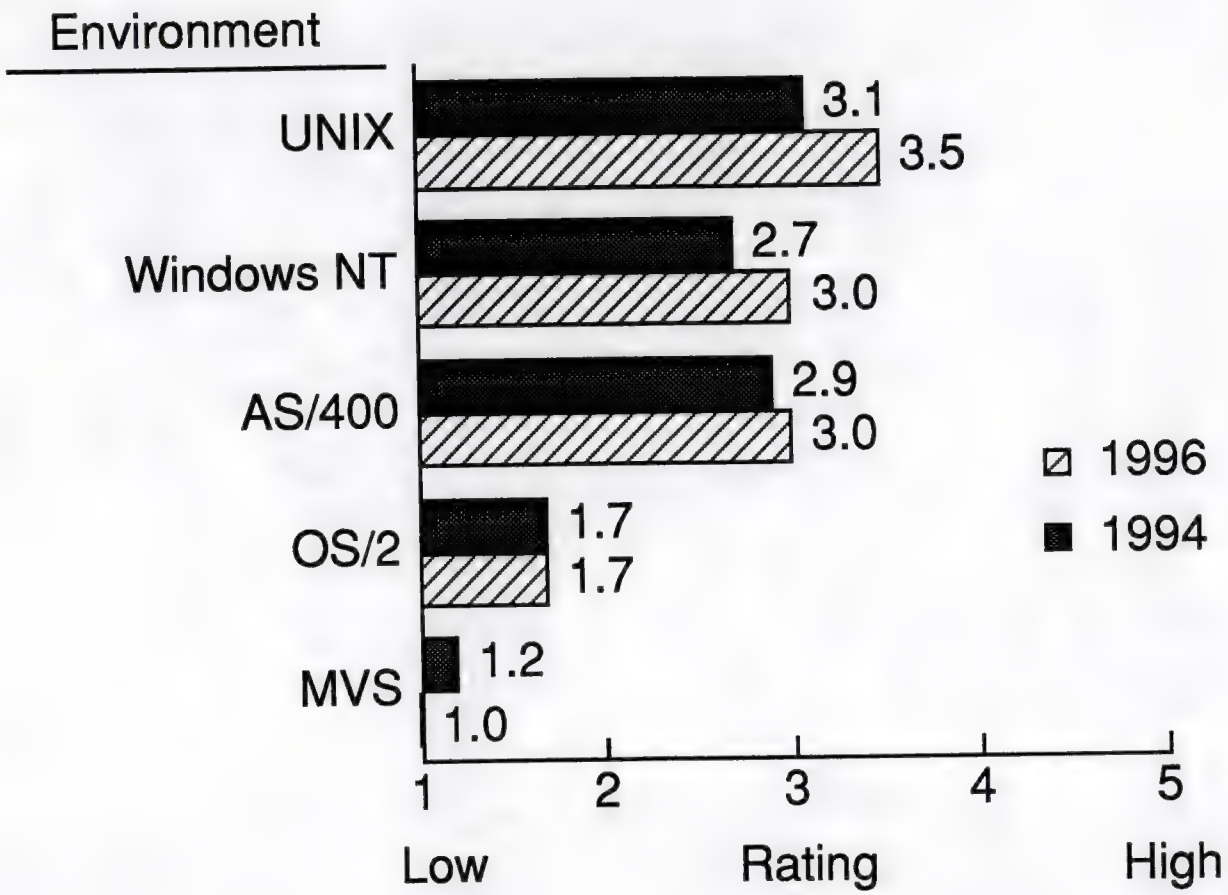


Exhibit IV-1g: Sweden

Ratings of Operating Environments: 1994 & 1996

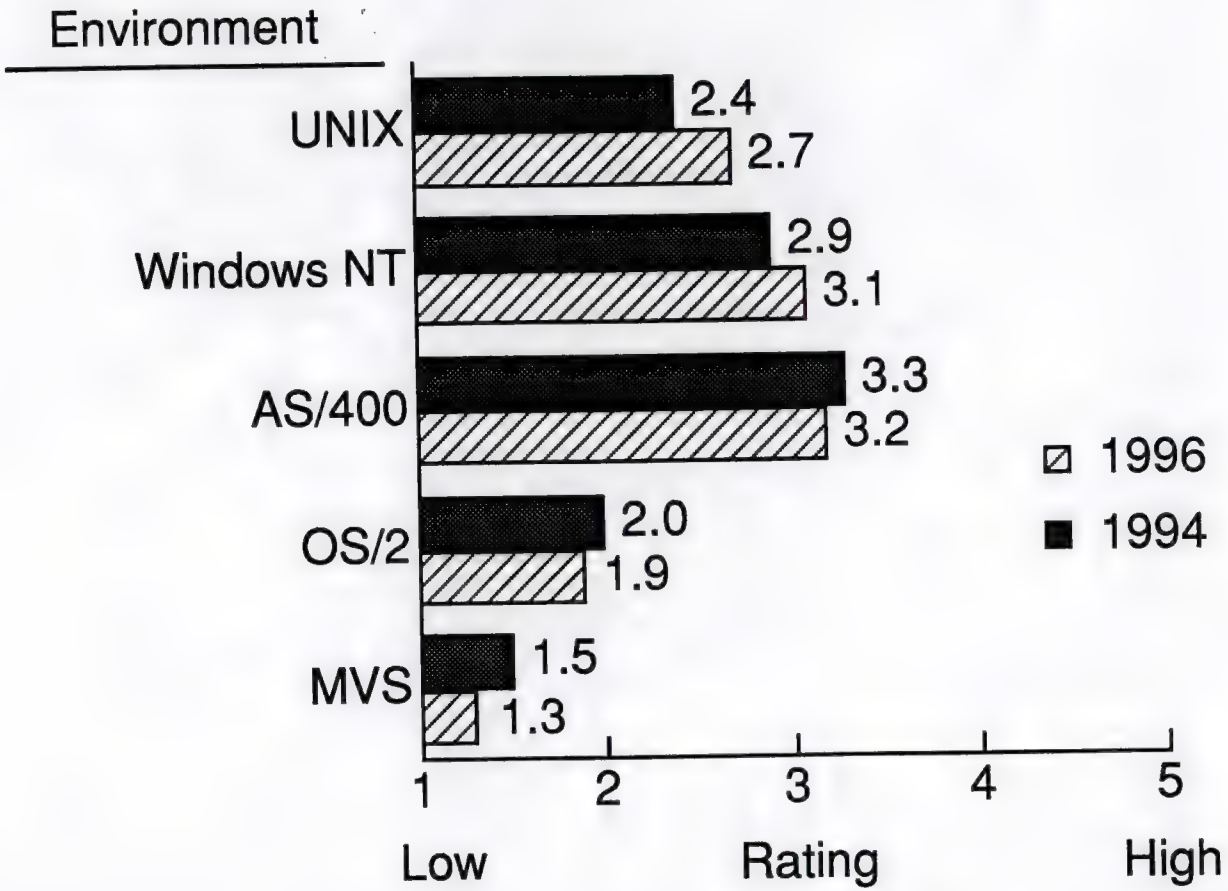


Exhibit IV-2 A: UK

UNIX Strengths: Respondent Comments

- Open, compatible, choice of software
- Strategic direction-soft options
- Existing OS financial investment already made
- Breadth of software used in other applications
- Standard proven best technology
- Compatibility. Different platforms can be used
- UNIX or Windows NT will become our company standard.
- Performance larger processors
- Open, better choice
- Open, choice of different vendors
- Open VMS, company policy, Digital hardware
- Operational consistency better hardware
- Have already installed open VMS, so the other are irrelevant.
- Currently deciding on our company's future operating environment

Exhibit IV-2 A: UK (cont.)

UNIX Strengths: Respondent Comments

- Open, compatible, can use different hardware
- New policy, strength open vendor independence
- De facto, standard, highest degree of sophistication
- Greatly improving, plenty of software to choose
- Perceived to be open choice of hardware
- Open, cost, performance
- Openness, choice of vendors, low operating costs

Exhibit IV-2 B: France

UNIX Strengths: Respondent Comments

- Easier for in house development, increased performance
- Greater operating performance reducing processing times
- Open, easier connectivity with other systems
- Power processing, good technology.
- Choice, most development is now into UNIX.
- Would integrate easier with existing system
- Can provide the necessary processing power
- Sensible way to go, no reliance on particular vendor
- Opens our hardware options, fits into our long term strategy
- Fast performance, relatively inexpensive
- Choice of software strong on 4GL's
- Has a better choice of financial software
- Choice, vast range of platforms
- Good product choice, easy integration if required
- Better software, more features, easy to use
- Most software can run on UNIX, latest technology
- Variety of platforms, operational consistency.
- It's open and would increase your choices.
- Standard and consistent, excellent performance for cost
- Total convergence, different level of operating platforms.

Exhibit IV-2 B: France (Cont.)

UNIX Strengths: Respondent Comments

- Open systems GUI's, soft keys
- Relax the grip of our existing suppliers
- Perceived openness, price/performance advantage
- Greater choice of software, vendor independence
- Is an option

Exhibit IV-2 C: Germany

UNIX Strengths: Respondent Comments

- Our existing suppliers have UNIX options
- Plenty to choose from, good user environment, soft screens, etc.
- Open, not locked-in, new hardware with low service costs.
- Easy move from XENIX, applications already written
- Complementary to existing systems best CIM/CAD offerings
- We want an open environment so we have a large choice of suppliers
- Consistency throughout the group, convergence
- Better features all round. Software is modern and more flexible.
- We can utilize existing hardware; low level IT expertise is required.
- Lower annual costs, connect additional users
- Standard and consistent, excellent performance/cost ratio
- Provide more options
- We'll buy the best solution for our needs. The operating system is irrelevant, but likely to be UNIX.
- Greater operating performance, reduced processing times

Exhibit IV-2 C: Germany (Cont.)

UNIX Strengths: Respondent Comments

- You move with the times. UNIX is the standard, so you go with it.
- You can run systems, database systems and applications in a multi-vendor environment.
- Independence, price advantages, lower maintenance costs
- Compatibility, price, performance
- Wider choice for packages and support
- Functionality and performance, strength in numbers
- Its the way to go. Total compatibility
- Range of available software, better support infrastructure
- Widely accepted de facto
- Compatibility across other platforms
- Only considering UNIX
- Good range of general engineering packages

Exhibit IV-2 D: Benelux

UNIX Strengths: Respondent Comments

- Selection of software, cost effective
- Is gaining market share. Mainframe vendors are responding to it.
- Can front end mainframe system, obvious pricing advantages
- Easy move to AIX, good range of hardware
- More MIPS per dollar spent
- Variety of choice. It's the future.
- Gives option beyond existing vendor. All new software development is UNIX.
- Cheaper hardware, greater choice of software
- Vendor independence, freedom of choice
- Accepted standard, wide choice of software
- Convergence compatibility, consistency across the company
- Vendor independence, larger choice of software
- Choice of vendor, easy use of 4GLs
- Open, greater choice, vendor independence
- Supported by a large number of hardware vendors

Exhibit IV-2 D: Benelux (Cont.)

UNIX Strengths: Respondent Comments

- Most manufacturing software will operate on UNIX
- Easy to implement in a multi vendor environment
- Open systems. Technological advances
- Easier convergence of different systems. Consistency for operations
- De facto Standard
- We don't wish to be tied into a part vendor
- (ULTRIX) can support all available VAX software
- Most software is already ported. Better choice of Dbases and 4 GLs engineering packages

Exhibit IV-2 E: Spain

UNIX Strengths: Respondent Comments

- Accepted standard compatibility
- Compatibility, more choice, don't need systems expertise
- Open
- Spread of applications. Price/performance development
- Powerful hardware. Decentralized operation
- Choice of hardware. Good communications features.
- It's open, but that's all
- Choice of hardware vendor independent
- Logical choice. Future considerations
- Wouldn't be suitable
- Definite way to go. Offers everything
- Better processing, faster, easier to use
- Open, not locked to a supplier. Better standard of software
- Acceptable internal standard

Exhibit IV-2 F: Italy

UNIX Strengths: Respondent Comments

- Open, excellent use of 4 GLs, functionality, etc
- High performance, low cost hardware
- It's open and it makes sense. Better choice, reduced costs
- It's the way forward. Easy to use, widely available
- Widely available. Very modular and flexible
- Consistency throughout the company.
- Open environment. Must consider the future
- Choice of software. Not locked in
- Compatibility, lower running costs
- Can use different suppliers systems
- Perceived compatibility. Price/performance
- Existing experience. Strategic decision on UNIX
- Powerful hardware. Alternative choices
- We have an open mind
- Small and cost effective. Easy to use
- Made a UNIX move many years ago
- Openness, cost

Exhibit IV-2 F: Italy (Cont.)

UNIX Strengths: Respondent Comments

- Currently policy, can use existing equipment
- CAD and CIM is well developed on UNIX
- Part of the company strategy. Compatibility, easy to modify
- Upgrade route from both our existing manufacturers

Exhibit IV-2 G: Sweden

UNIX Strengths: Respondent Comments

- Easy migration. Powerful hardware lower costs
- Vendor independence. Parent companies' new policies
- Better software consistency. Choice
- Newer technology. Used different hardware
- Compatible. Seamless integration
- Very powerful. Choice of software
- Vendor is independent. Excellent windows features
- New standards to adopt
- Increasing in size. Better choice 3rd party packages
- Committed to UNIX
- Consistent easy to move to. New standard, De facto proprietary
- Open, future port to take loser costs
- Supposed openness. Choice of hardware vendors
- Easily maintainable, vendor independent
- Range of software. FASR hardware not locked in
- Features rich combination of vendors.

Exhibit IV-3 A: UK

UNIX Weaknesses
Respondent Comments

- Software is not friendly. Need high skills level
- No operational benefits above VMS in use
- Threat of NT
- Probably too big for our needs
- Presents no advantage to us, cost of moving to UNIX
- Traumatic change
- Too fragile at present
- The UNIX variants
- Complicated, difficult to manage
- Committed to Apple. None of these are currently relevant.
- Ease of migrating existing software
- What to do with our old equipment

Exhibit IV-3 B: France

UNIX Weaknesses
Respondent Comments

- Can't run on VAX
- The different types on UNIX
- Better manufacturing software available proprietary
- Doesn't have a wide range of manufacturing applications
- Different vendors have different versions
- The best CAD solutions aren't necessarily UNIX
- We want a solution to our needs
- The operating systems will be determined by our choice of software
- Not a wide choice in true UNIX MRP software
- Ability to run existing ledgers
- Weaker in manufacturing
- "Open" benefits aren't always realized
- Not as portable as you are led to believe
- It holds no operational benefits to me
- Different compliance
- Not as robust as some proprietary systems
- I don't believe one environment is better than the other. Most suppliers offer UNIX
- Most of our existing systems are Digital
- We have no track record in UNIX
- Already committed to AS/400

Exhibit IV-3 C: Germany

UNIX Weaknesses
Respondent comments

- It would be difficult and expensive to move to UNIX
- Low-end packages are quite expensive
- UNIX isn't an easy systems manager
- Some companies are pushed into UNIX for no apparent reason
- May still be tied to vendor
- Different compliances
- Already have a high investment in AS/400
- Not as strong on manufacturing applications
- I see no commercial benefit in UNIX.
- High license fees
- Wouldn't easily fit into our existing plans
- Confusion in standards
- Each vendor has their own version
- Not completely compatible
- Doesn't fit into our strategy
- Poor support and too many variations
- Too expensive

Exhibit IV-3 D: Benelux

UNIX Weaknesses
Respondent comments

- Expensive to move to UNIX
- Several operating systems from different manufacturers
- Which do you choose?
- Not always dealing with the software authors
- Have to buy from dealers and re-sellers
- Lack of industry specific software
- System routines are not as robust
- Which choice of UNIX?
- May be upstaged by Windows NT
- Porting is not easy
- Not all UNIX is compatible
- Ability to support existing VAX installations
- Which do you choose?
- Too many variants
- Limited to Digital
- Some UNIX interfaces are difficult to use

Exhibit IV-3 E: Spain

UNIX Weaknesses
Respondent comments

- Software isn't always easily from one platform to another
- No operational benefits, will not run on VAX
- Rewriting existing software
- Difficulty in moving software
- Slight differences in AIX
- UNIX expertise of the re-sellers
- Not as robust as comet

Exhibit IV-3 F: Italy

UNIX Weaknesses
Respondent comments

- Not a policy to move to UNIX
- Needs a lot of disk space
- UNIX is a new operating system for us.
- Cost justification of replacement
- Very different from proprietary IBM
- Difficult move from a system
- Does not easily communicate with VAX
- No commercial benefit to us
- Don't know much about UNIX
- Connectivity to VMS
- UNIX is new to us
- Too flexible, difficult to install
- Not sure

Exhibit IV-3 G Sweden

UNIX Weaknesses
Respondent comments

- New culture, unproven
- Not UNIX expertise
- Migration from IBOL
- Which one do you choose???
- New, traumatic change for U.S.
- Throw out existing hardware
- New environment, too much to change
- Not currently using UNIX, still new to us
- Not considered
- Needs system management. License fees are high.
- WAN interactive is very alien. Too many packages to choose from
- Perceived benefits are not always realized.
- Less choice of specific applications
- Do consider it to be robust enough
- Weaker in end of day security procedures
- Too expensive to change

Exhibit IV-4 A: UK

AS/400 Strengths
Respondent Comments

- Mature and developed, large choice of applications
- IBM policy installed worldwide
- We have standardized on AS/400 and are unlikely to consider anything else
- Proven, well developed, first class software
- Already decided to go to AS/400, easy upgrade from system 36
- Best mid-range operating system
- Good stable operating system, well established in healthcare
- Well established, already using
- Well established
- Installed throughout the industry
- Very functional, security conscious
- Already using AS/400 not considering anything else

Exhibit IV-4 B France

AS/400 Strengths
Respondent Comments

- Very strong in manufacturing, good robust operating system
- Good software easy move from S/36
- Have strong production bias
- Known to us, good choice of solutions
- Existing software, first class equipment
- Availability of software, IBM has a manufacturing support unit
- Easier move from S/34
- Corporate commitment well developed
- Very strong manufacturing products
- Known to us, tried and trusted
- Sound technology, safe option
- Good reputation, large installed base, worldwide
- Excellent software choice, robust, reliable
- Good operating system
- Good software offering well proven machine
- Good traditional offering
- Well established track record, lots of sites in France

Exhibit IV-4 C: Germany

AS/400 Strengths
Respondent Comments

- Easy upgrade from s/36. Lots of available software
- Proprietary
- Well developed
- Fully integrated software. Good communication features
- Corporate commitment software investment
- Good operating system
- Well established, solid. Lots of European sites
- Very strong in production areas, ideal operating system
- Well proven, stable. Great RPG
- Commitment to operating system/400, excellent applications
- Well established in Germany. Good reputation
- Large user base in Germany
- Good applications available
- Strong and established. First rate applications

Exhibit IV-4 D: Benelux

AS/400 Strengths
Respondent Comments

- Already operational in the group. Tried and reliable
- More sophisticated applications. Good work horse
- Sound offering for existing IBM customers
- Well proven system
- Well established. Solution oriented
- High level operating system/400, simple level storage
- Well proven excellent technology
- Stable, well proven, strong in manufacturing
- Large choice of software offerings endorsed by IBM
- High functional, good reputation

Exhibit IV-4 E: Spain

AS/400 Strengths
Respondent Comments

- Already used in company, good operating, plenty of available software
- Well known to us, safe and stable
- Established, everything in RPG and Cobol
- Successor to S/36, familiar and well proven
- Committed to product, best software on the market
- Committed to AS/400, couldn't realistically consider anything else

Exhibit IV-4 F: Italy

AS/400 Strengths
Respondent Comments

- Already installed as our standard
- Preferred option, safe choice
- Existing system, stable and well refined
- Well established, strong in our industry
- We have an open mind.
- Known to us.. We have experience in operating systems/400.
- Existing systems, better integration
- Have decided on AS/400
- Natural move from S/38, migration path, common environment
- Already have an AS/400, easy upgrade
- Stable, big user base
- Mature, well established. All the applications we developed are operating system/400.

Exhibit IV-4 G: Sweden

AS/400 Strengths
Respondent Comments

- Presently committed to AS/400 and have no plans to move
- Solid commitment to AS/400. Don't plan to move
- Our software is developed for as 400 IT works and we are happy
- Mainframe conversion tools. Excellent operating system utilities
- Ideal options Cobol background
- Used through out group. No retraining. Proven software
- Easy migration from S/38 software continuity
- Familiar environment. RPG2 Cobol good package
- Preferential choice. Current IBOL customer
- Stable, well proven. Specially developed software
- Workhorse system. Integrated database
- Strong in Sweden, very robust
- Already have software running. We know it very well
- This has been chosen as the standard
- Software is stable
- Decided upon
- Good operating system. Proven, well installed base

Exhibit IV-5 A: UK

AS/400 Weaknesses
Respondent Comments

- Bureaucratic, could buy cheaper and better elsewhere
- Not applicable to CAD
- Developed expensive upgrade
- Only runs on IBM
- Proprietary
- Not relevant
- IBM only
- Proprietary
- Committed to Apple. None of these are currently relevant
- Proprietary and not even considered
- Not UNIX and therefore difficult to look favorably

Exhibit IV-5 A: France

AS/400 Weaknesses
Respondent Comments

- Can't run on VAX
- Most AS/400 packages are now available in UNIX
- Still ties us to IBM
- Proprietary and limits your choice of software house
- Hardware is expensive in relation to UNIX
- We want a solution to our needs
- The operating system will be deter by our choice of software
- Annual costs are high
- We excluded it on the UNIX argument
- WE want to get away from this
- Limits us to IBM software houses
- Ties us to IBM
- Proprietary
- Can it resist the UNIX drive
- CAD environment
- Proprietary
- It's not a true open system
- Proprietary
- Proprietary wouldn't go with it's not UNIX, although IBM claims it's open
- Reluctant to move from Digital
- Limits you to IBM

Exhibit IV-5 C: Germany

AS/400 Weaknesses
Respondent Comments

- Locked into IBM
- Wouldn't consider it
- Too costly
- Takes a lot of disk space and is expensive
- Proprietary
- Restricted to IBM
- It's proprietary ties you to IBM
- Everything the AS/400 offers is available in UNIX
- Can be costly to upgrade hardware
- No easy resource sharing with Digital
- Hardware isn't price competitive
- Not UNIX. IBM re-sellers are moving to other vendors
- It's not UNIX and wouldn't be considered
- Proprietary and would not be considered
- IBM only
- Lack of interpretability with other vendors

Exhibit IV-5 D: Benelux

AS/400 Weaknesses
Respondent Comments

- Can it resist UNIX?
- Proprietary would not be bought by now-IBM customer
- It's unlikely that we would go IBM
- Not UNIX
- Want open system
- Needs a lot of disk
- Can be cumbersome and difficult to learn
- Limiting choice of hardware
- It's proprietary
- Proprietary system
- Want UNIX
- Isn't a serious CAD machine
- Not open

Exhibit IV-5 E: Spain

AS/400 Weaknesses
Respondent Comments

- Proprietary and too big for our needs
- Expensive to maintain
- Starting to age
- High annual costs
- Ties us to IBM
- Prone to disk crash
- Decided on UNIX
- Too big and expensive

Exhibit IV-5 F: Italy

AS/400 Weaknesses
Respondent Comments

- Restricted choice of 3rd parties
- Open policy
- Less user oriented
- Lacks the nicer interfaces
- Is not open
- Cost, over sophisticated
- Not open
- Not known for shop floor applications
- IBM service has declined
- Wouldn't be applicable

Exhibit IV-5 G: Sweden

AS/400 Weaknesses
Respondent Comments

- No ease of use and improvements
- Still proprietary. Different communication interfaces
- Proprietary and dead end tied to one box
- Commits us to a single vendor
- Not open
- Software development is to long
- Limits your choice of 3rd party supplies
- Not considered
- Has been chosen as the standard
- It is a one way street
- Proprietary high running cost

Exhibit IV-6 A: UK

OS/2 Strengths
Respondent Comments

- Used on some PCs good for development
- Object oriented 32 bit, fast development
- Can (or will) be able to run Autocad
- Well defined PS2 interfaces, good graphics
- Already used on our PCs good language
- PC based 32 bit fast

Exhibit IV-6 B: France

OS/2 Strengths
Respondent Comments

- 32 bit object oriented
- Very functional, liked by developed team
- Strong in production side. Good control in shop floor
- Object oriented fast, technical leader
- Some experience on OS/2 incorporates some
- Easy to use, good productivity and development good macros
- Has a good CAD product
- Fast! it can run uses o-o methods. Dos, windows and operating system/2
- Very competent operating system fast compiling

Exhibit IV-6 C: Germany

OS/2 Strengths
Respondent Comments

- Technically excellent for development
- Object oriented
- 32 bit fast, versatile
- 32 bit, best technical operating system around
- Object linking 32 bit graphics
- Easily programmable fast, multi-tasking

Exhibit IV-6 D: Benelux

OS/2 Strengths
Respondent Comments

- Object oriented integrated RDBM
- Easy to use, stable PC driven 32 bit
- High specification, Fast with excellent graphics
- Technical leader very stable operating system
- Complementary with mainframe and workstation systems
- Great for development fast 32 bit, object oriented
- Technically very sound, very good for developing

Exhibit IV-6 E: Spain

OS/2 Strengths
Respondent Comments

- Used on some of our PCs good for programming
- Very good PC software easy to modify
- Very superior object programming fast, good graphics
- Acceptable internal standard

Exhibit IV-6 F: Italy

OS/2 Strengths
Respondent Comments

- Good development tool runs well on PC
- We do some work on OS/2
- We have an open mind
- Technically a very good product
- Good CAD offering easily modified

Exhibit IV-6 G: Sweden

OS/2 Strengths
Respondent Comments

- Very functional popular with developers
- Multi user 32 bit good graphics
- Easy to use fast for development
- Very good for controller factory devices
- Already used in company good multi user abilities
- Will be considered for smaller PC based solutions
- Both systems work well in multi user PC environment. Good use of Micro Channel
- May run on a small multi use system

Exhibit IV-7 A: UK

OS/2 Weaknesses
Respondent Comments

- Undersold
- Lack of packages
- Limited in applications
- Not seen as the main environment
- Haven't the capability to support manufacturing systems

Exhibit IV-7 B: France

OS/2 Weaknesses
Respondent Comments

- Slow, bug ridden
- It's not popular
- Restricts your choice of hardware
- No more development on PS/2 AIX
- We want a solution to our needs
- The operating system will be deter by our choice of software
- Not enough applications. Future is?
- Uncertain future, upstaged by NT
- Limited and supported by fewer vendors
- Confused future
- Difficult to learn

Exhibit IV-7 C: Germany

OS/2 Weaknesses
Respondent Comments

- Not application driven
- Not enough applications
- Couldn't compete with AIX
- A large number of bugs
- Limited in it's choice of platforms
- Unknown future

Exhibit IV-7 D: Benelux

OS/2 Weaknesses
Respondent Comments

- No long term commitment
- Can be expensive in relation to other PC operating systems
- It's future has a question mark
- Not enough applications
- Future of the product
- Under-resourced by IBM
- Shadowed by NT
- It is not heavily promoted

Exhibit IV-7 E: Spain

OS/2 Weaknesses
Respondent Comments

- It has never really established itself as a major operating system
- Limited in scope
- Not a main stream environment

Exhibit IV-7 F: Italy

OS/2 Weaknesses
Respondent Comments

- Still data processing oriented. A dead end
- Is rarely seen as a "main operating system"
- It's not a strategic product
- Suppliers don't push it
- Not in widespread use
- Wouldn't be applicable

Exhibit IV-7 G: Sweden

OS/2 Weaknesses
Respondent Comments

- Not commercially proven yet
- Lack of programming interfaced
- Dead end
- Increased running costs
- Not really a main stream open system
- Is losing the battle with NT
- A matter of deciding which is best (OS2 or NT)
- Declining operating system
- Good for PC based operating system not for main applications

Exhibit IV-7

OS/2 Weaknesses

Exhibit IV-8 A: UK

Windows NT Strengths
Respondent Comments

- PC integration easy to upgrade/costs
- UNIX complimentary-excellent GUI
- New exciting client/server
- Could complement existing software
- Similar functionality to UNIX
- UNIX or windows NT will become our company standard
- Can (or will) be able to run Autocad PC based
- Well promoted exciting future and characteristics
- New, exciting
- Best client/server option, super for development
- Powerful extensional of windows 32 bit, excellent performance
- PC based 32 bit fast
- New standard for Digital their client/server environment

Exhibit IV-8 B: France

Windows NT Strengths
Respondent Comments

- Supports different programming interfaces
- Has everything that OS/2 has plus more
- New and will be widely accepted
- Would appear to work well in PC environment
- Exceptional future potential fact software development
- Similar to UNIX
- Ideal for client/server latest technology
- A better version of OS/2
- Looks impressive good graphics capability
- A large amount of new development is being done under NT
- Very functional, 32 bit, good GUI
- It may be the next de facto standard
- Will be the new standard for client/server

Exhibit IV-8 C: Germany

Windows NT Strengths
Respondent Comments

- Excellent performance in client/server
- Sounds good, a lot of press coverage
- Everyone is getting excited about it
- Different programming utilities. Fast, quick for development
- We want an open environment so we have a large choice of suppliers
- Operates on the Alpha
- Similar to UNIX
- Plenty of press coverage. Ideal client/server
- Better that OS/2 choice of interfaces
- Very functional, fast 32 bit, good GUI
- Technically like OS/2 but with better interface
- Easy to develop applications. Good retrieval techniques
- High level development tool, no variances of NT
- Wider choice for packages and support
- Will rival UNIX in the future
- Similar to UNIX most developers are designing an NT version
- Extremely popular powerful interfaces, easy to develop
- Similar to OS/2
- Client/server 32 bit choice of programming interfaces
- Can handle very complex tasks object technology

Exhibit IV-8 D: Benelux

Windows NT Strengths
Respondent Comments

- New, fast, ideal for corporate buyers
- Similar to UNIX
- PC origins, easy to use
- Convergence, compatibility consistency across the company
- We will consider NT and how it will impact on our strategy
- Seems to be the operating system that everyone is talking about
- Maybe the new standard high functionality
- Large support from the application developers
- Will operate on the Alph AXP
- Technically equivalent to OS/2, but better sold
- As operating system, but with a high degree of expectancy
- Choice between UNIX and windows
- It will be the future core for client/server

Exhibit IV-8: E: Spain

Windows NT Strengths
Respondent Comments

- New standard PC based 32 bit very fast
- As UNIX but with better graphics and PC options
- Spread of applications price/performance development
- Digital's Alpha will support windows NT
- Powerful hardware decentralized operation
- Choice of hardware vendor development 32 bit, very fast, great development
- Strong alternative to UNIX
- Wouldn't be suitable
- Sounds very promising
- PC dealers are all talking about windows
- Acceptable internal standard

Exhibit IV-8 F: Italy

Windows NT Strengths
Respondent Comments

- Ideal networking environment, super workstation functions
- It's the way forward easy to use, widely available
- NT has promise, But I would like to see it in 12 months form now
- Consistency throughout the company
- User interfaces, New technology
- Is improving with more applications
- Fast, new and being well promoted
- Good operating systems use Windows
- Well presented powerful for client/server
- We have an open mind
- Good PC offerings
- Is a strong front runner everyone is looking at NT
- Modern, technically very superior
- PC oriented, mixes well in a PC environment

Exhibit IV-8 G: Sweden

Windows NT Strengths
Respondent Comments

- As UNIX but client server
- New/powerful everyone's going to windows
- Client server PC driven makes the best use of technology
- Future potential very attractive
- Improving and may rival UNIX
- Good operating environment great flexibility
- Very similar to UNIX PC driven
- As UNIX, 32 bit very fast
- This is now the preferred option classic client server
- Will be considered for smaller PC based solutions
- Works well with multi user PC environment good use of micro channel
- Up and coming most vendors are offering NT options
- New PC standard superior to anything else
- May run on a small multi use system
- Great impact for the future flexible

Exhibit IV-9 A: UK

Windows NT Weaknesses

Respondent Comments

- Not mid-range based
- How will it compete against UNIX?
- Limited applications
- Existing applications do not run on NT
- No confidence in the applications yet
- Too early to judge
- Haven't the capability to support manufacturing systems
- Lack of current applications

Exhibit IV-9 B: France

Windows NT Weaknesses

Respondent Comments

- "Newness"
- Not enough applications
- Not established in the manufacturing arena
- Not relevant
- We want a solution to our needs.
- The operating system will be determined by our choice of software.
- Not relevant
- I don't know what packages it can run.
- A great number of packages
- Don't yet run under NT
- Similar to UNIX
- Not yet established
- Still early on the market
- None of our short-listed applications could run NT.
- New and still lacks pure applications
- I don't believe one environment is better than the other.

Exhibit IV-9 C: Germany

Windows NT Weaknesses
Respondent Comments

- It's not clear how it differs.
- Not factory floor proven
- Some packages don't yet operate under NT.
- Siemans doesn't have NT offering.
- Can it live up to its reputation?
- New, still lacks applications
- Not enough applications in Germany
- Well behind UNIX in package applications
- Re-sellers don't have NT manufacturing solutions.
- Not enough packages available yet
- Young environment
- Limited in its choice of platforms
- Its relationship with AS/400
- Not established enough yet

Exhibit IV-9 D: Benelux

Windows NT Weaknesses
Respondent Comments

- Can it deliver what it promises?
- Still in infancy
- Don't know enough about it
- Lack of communication and networking software
- Not yet established
- Not yet sold in volume
- Ability to support existing VAX installations
- Still early days
- Not yet shipped in volume
- Application only under development
- Could it be another PICK

Exhibit IV-9 E: Spain

Windows NT Weaknesses
Respondent Comments

- Applications not widely available
- The software which we considered did not run under NT.
- Not established

Exhibit IV-9 F: Italy

Windows NT Weaknesses
Respondent Comments

- Cost justification of replacement
- Being aimed almost exclusively at client/server
- Not production orientated

Exhibit IV-9 G: Sweden

Windows NT Weaknesses
Respondent Comments

- Wouldn't be applicable
- As UNIX but client server
- Lack of available applications
- Very new unstable
- Microsoft versus the rest
- Ability to run various packages
- Which is best, operating system/2 or windows NT??
- Will it compete or complement UNIX
- Applications are only now being ported
- NT is very heavy on hardware
- Weak in end of day security
- Good for PC operating system, not for main applications

Exhibit IV-9

Windows NT Weaknesses

Exhibit IV-10 A: UK

MVS Strengths
Respondents Comments

- Stable product, well developed in our company

- Rock solid, used before

Exhibit IV-10 B: France

MVS Strengths
Respondents Comments

- Well known in this company, depth and security
- Stable and well developed
- Well established
- Strong and stable, liked by programmers
- MV has lasted the course very solid

Exhibit IV-10 C: Germany

MVS Strengths
Respondent Comments

- Very solid, been around 20 + years

- Releasing an open version, can act as a large server

Exhibit IV-10 D: Benelux

MVS Strengths
Respondent Comments

- Long established product, sound applications
- Excellent data storage, open version now available
- Been around a long time, easy to tailor software open systems version
- Only for existing mainframes
- High level operating systems, well tried and trusted
- MVS well known and reliable
- It's been around a long time. Very sound

Exhibit IV-10 E: Spain

MVS Strengths
Respondent Comments

- UNIX
- Solid
- Strong history in traditional mainframe computing

Exhibit IV-10 F: Italy

MVS Strengths
Respondent Comments

- Plug compatible, handle almost every computing task, batch processing
- High input/output capabilities
- First rate input/output centralized solution
- We have an open mind.

Exhibit IV-10 G: Sweden

MVS Strengths
Respondent Comments

- Used on the mainframe, powerful
- Strong, robust, traditional input/output
- Established but moving away from mainframe
- Now available in client/server applications

Exhibit IV-10

MVS Strengths

Exhibit IV-11 A: UK

MVS Weaknesses
Respondent Comments

- Future is under threat
- Not applicable to us
- On the decline
- Old
- Mainframe and not applicable

Exhibit IV-11 B: France

MVS Weaknesses
Respondent Comments

- Limited to mainframes
- Old fashioned and decreasing in popularity
- Very limited as it's mainframe oriented
- Too big, costly and rigid. We want a solution to our needs. The operating system will be determined by our choice of software.
- It's days are numbered.
- Most mainframe sites are downsizing to mid range or UNIX.

Exhibit IV-11 C: Germany

MVS Weaknesses
Respondent Comments

- Old and limited to very large sites
- Too costly. It's not compatible across all mainframe ranges.

Exhibit IV-11 D: Benelux

MVS Weaknesses
Respondent Comments

- Is limited to the range of mainframes
- Doesn't span the entire range of processors
- Old and dead
- Threat of downsizing decreasing population
- MVS was not suited to a departmental function. It's big and needs a data processing function to operate

Exhibit IV-11 E: Spain

MVS Weaknesses
Respondent Comments

- Old, centralized computing
- Doesn't run RDBM software well
- Ability to offer a decentralized option
- Too big and expensive

Exhibit IV-11 F: Italy

MVS Weaknesses
Respondent Comments

- Downsizing is imminent
- Poor performance with relational data bases
- We want to wind down the programming aspect.

Exhibit IV-11 G: Sweden

MVS Weaknesses
Respondent Comments

- Mainframe and not applicable
- Not aimed at decentralized processing
- Too big
- Not suited to decentralize computing
- Not as transportable as UNIX
- Version available soon
- Unable to convert from MVS to anything

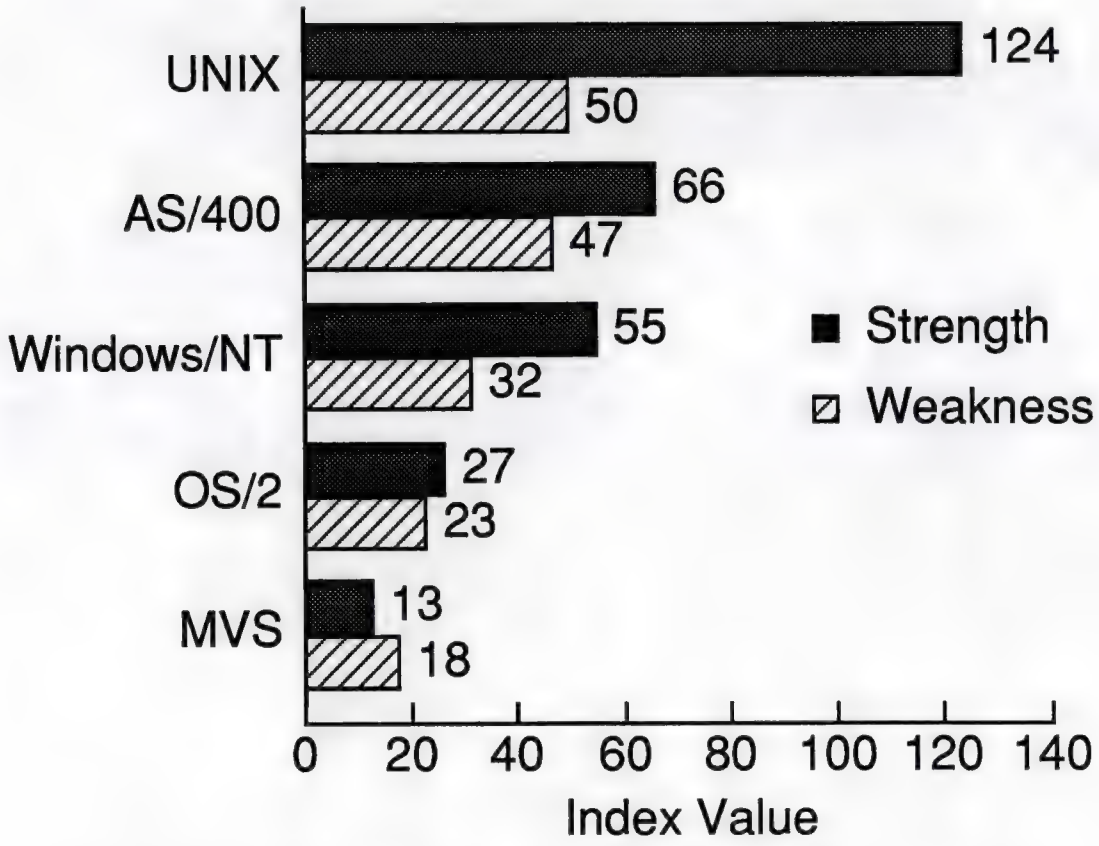
Exhibit IV-12

Operating Environment Strengths and Weaknesses: Summary

Environment	Strengths	Weaknesses
UNIX	• Portable/open • Wide use • Inexpensive hardware	• Immature • Not standard • Complexity/ease of use
AS/400	• Installed base • Ease of use • IBM • Software packages	• Proprietary • Cost
OS/2	• Technology • Portable	• Proprietary • Market acceptance
Windows NT	• Microsoft • Technology • Image	• Untried
MVS	• Reliable • Power	• Cost/size • Obsolete • Proprietary

Exhibit IV-13: Europe

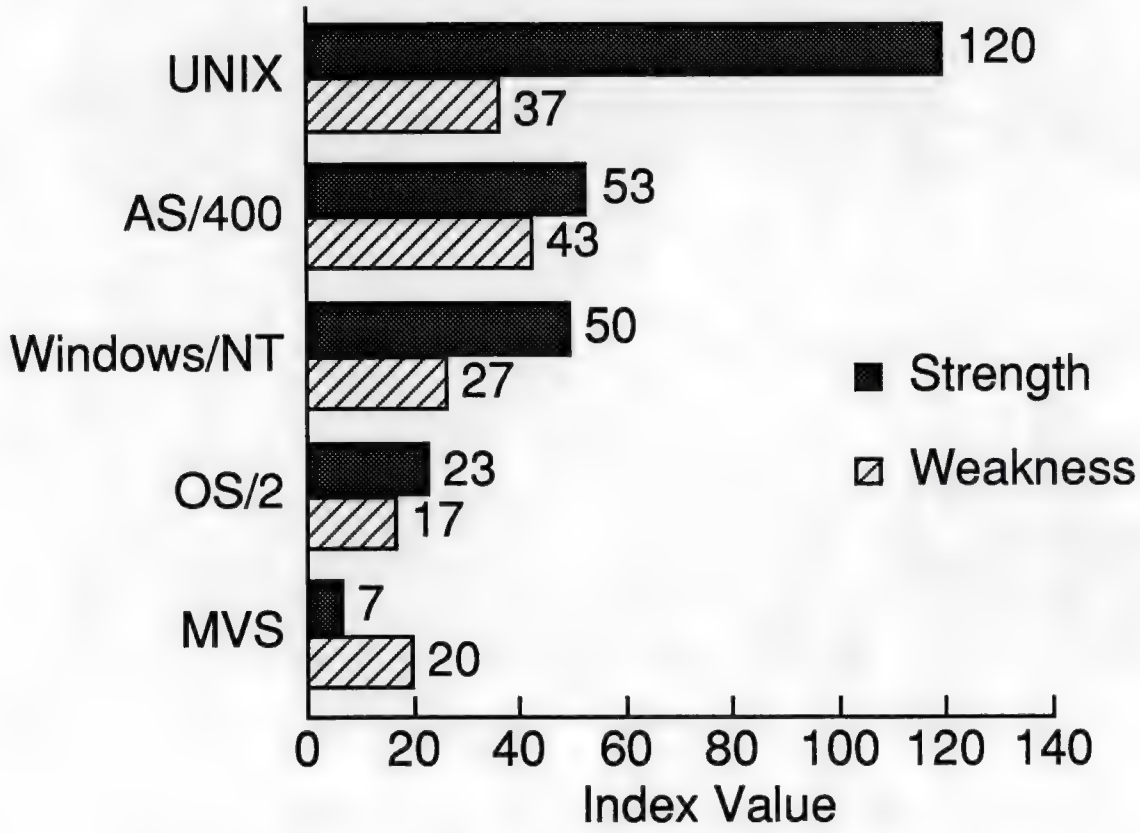
Index of Strengths and Weaknesses for Operating Environments



Note: Index value = Total mentions/number of respondents (210)

Exhibit IV-13a: U.K.

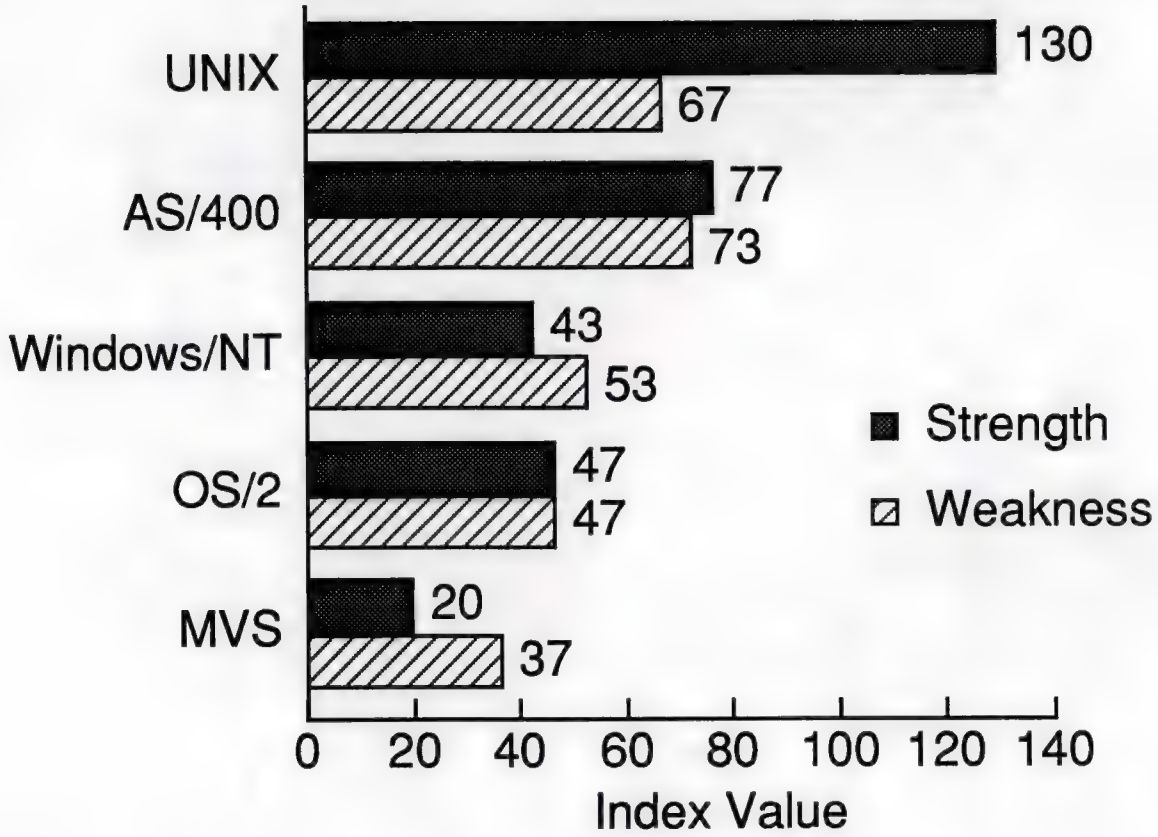
Index of Strengths and Weaknesses for Operating Environments



Note: Index value = Total mentions/number of respondents (30)

Exhibit IV-13b: France

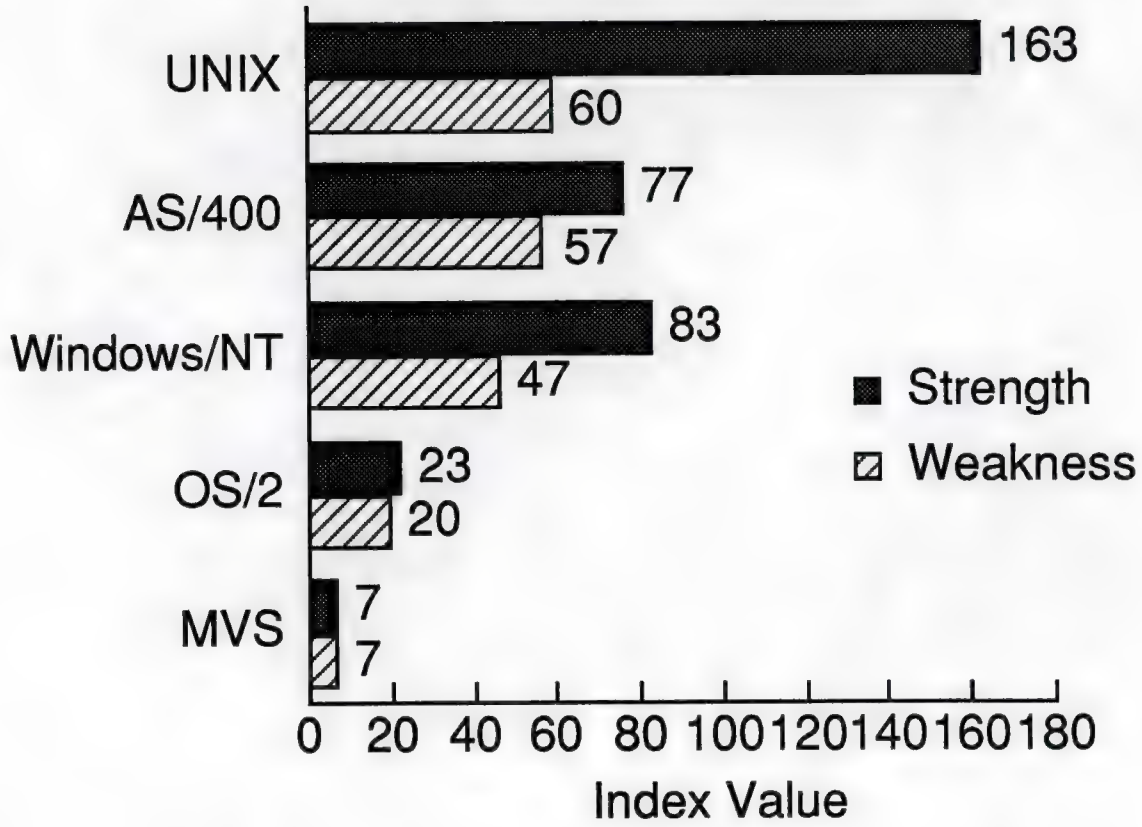
Index of Strengths and Weaknesses for Operating Environments



Note: Index value = Total mentions/number of respondents (29)

Exhibit IV-13c: Germany

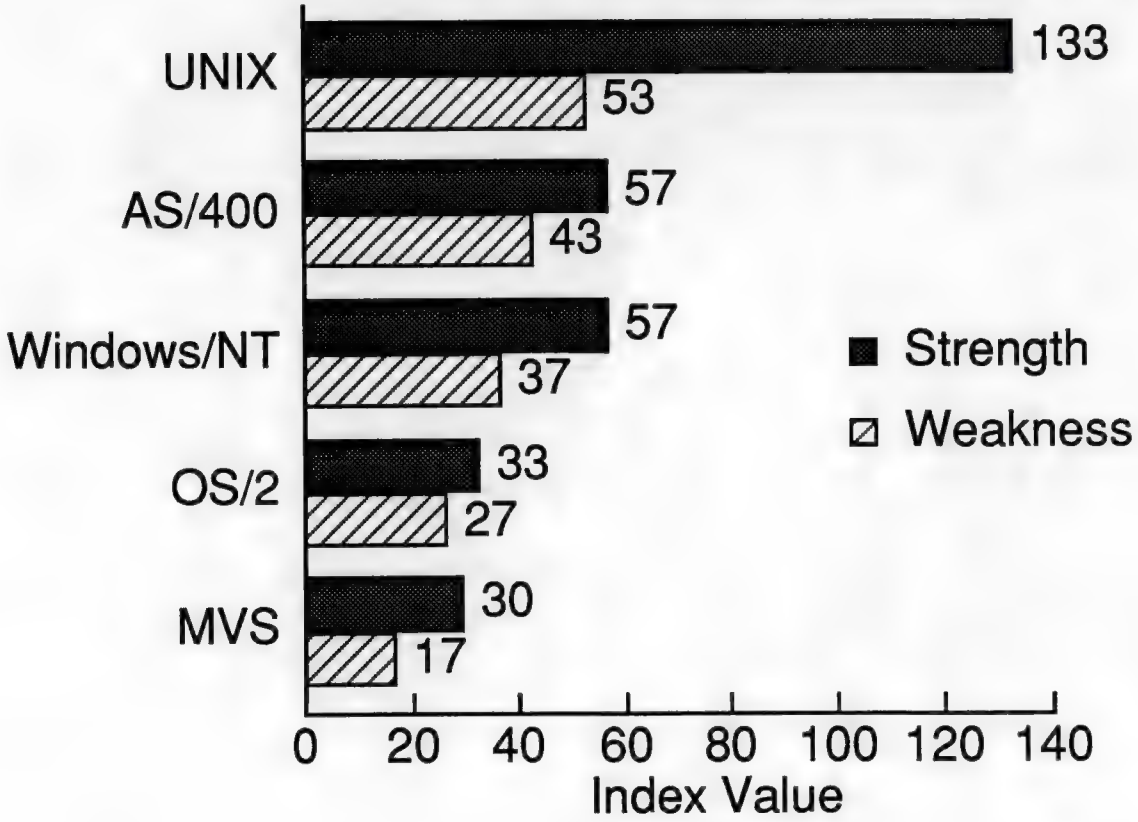
Index of Strengths and Weaknesses for Operating Environments



Note: Index value = Total mentions/number of respondents (30)

Exhibit IV-13d: Benelux

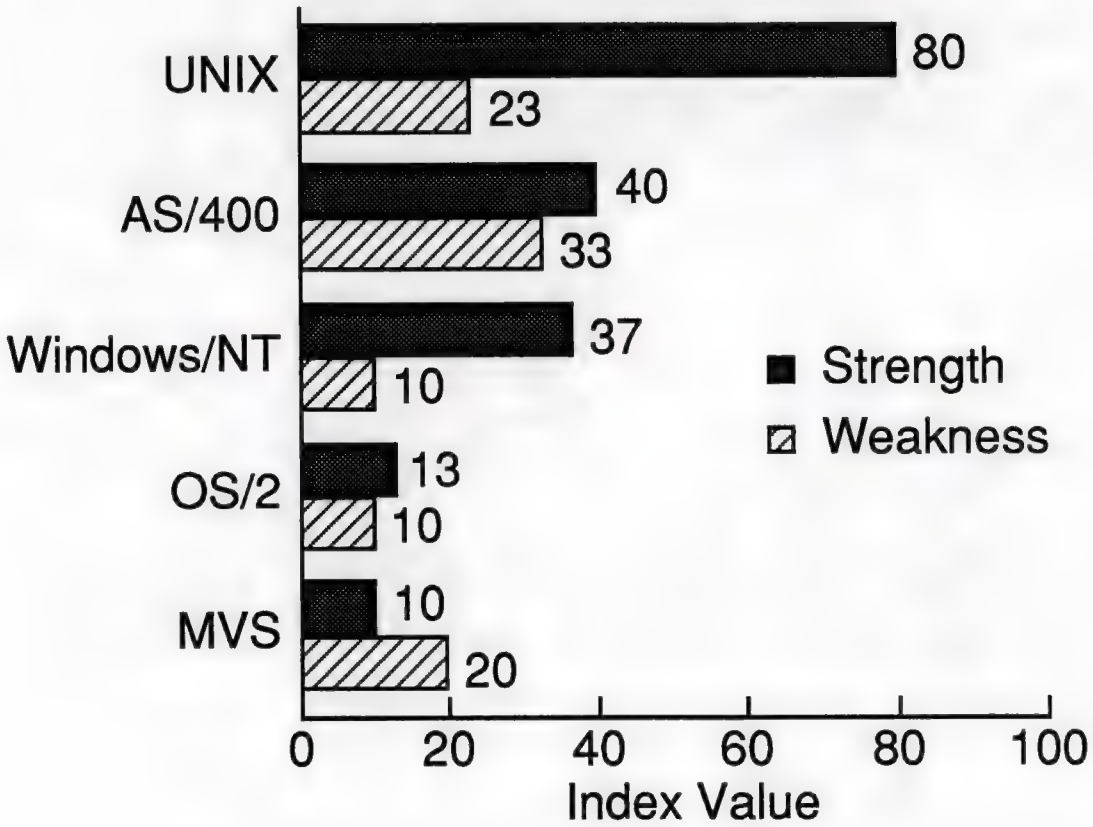
Index of Strengths and Weaknesses for Operating Environments



Note: Index value = Total mentions/number of respondents (30)

Exhibit IV-13e: Spain

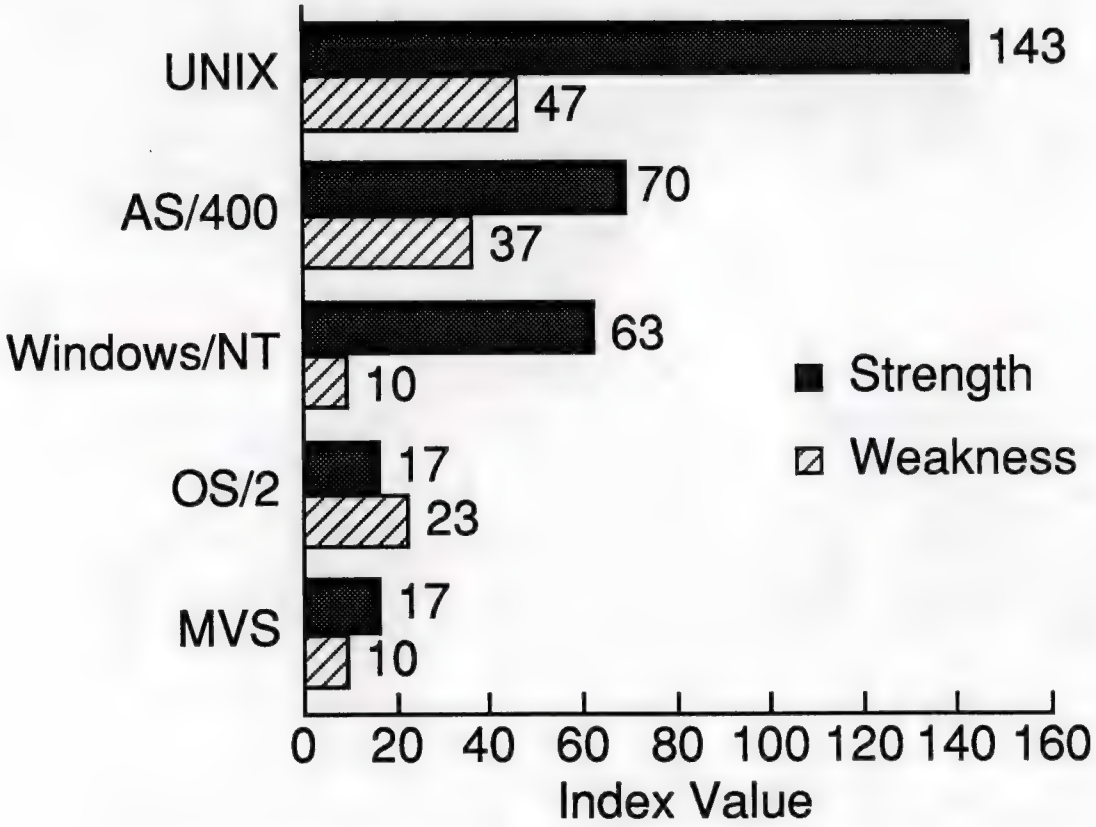
Index of Strengths and Weaknesses for Operating Environments



Note: Index value = Total mentions/number of respondents (30)

Exhibit IV-13f: Italy

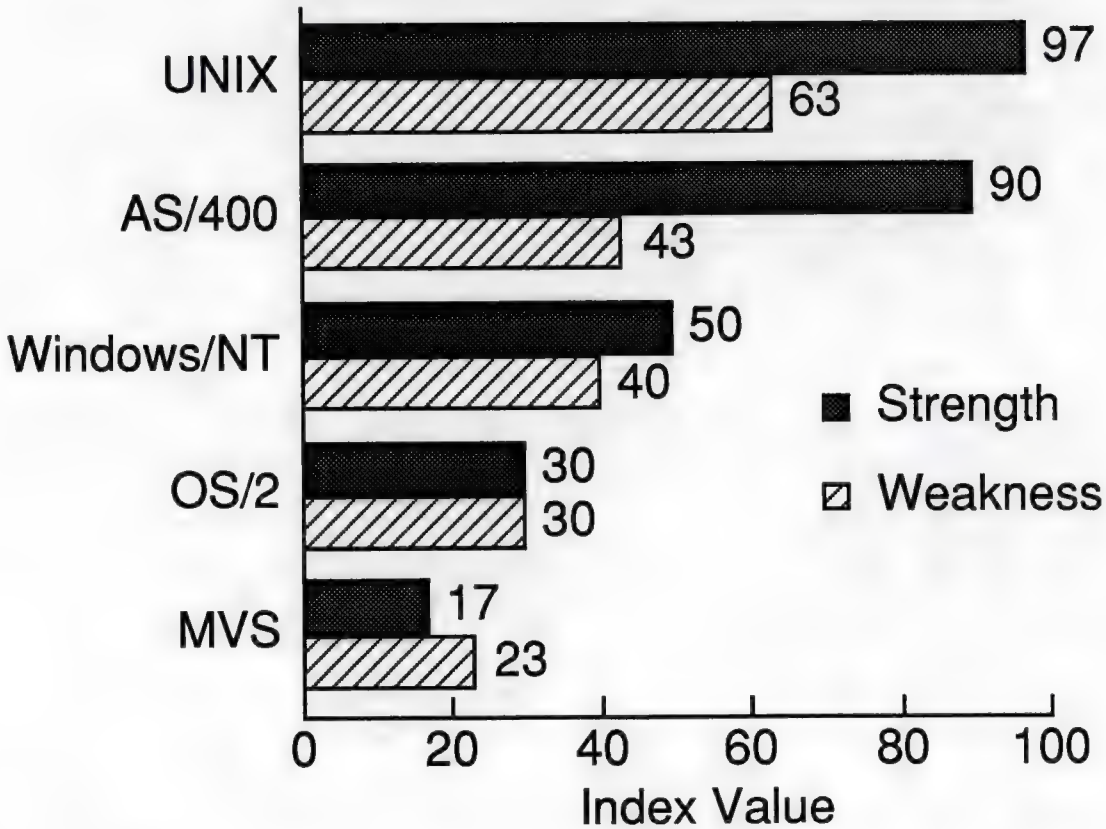
Index of Strengths and Weaknesses for Operating Environments



Note: Index value = Total mentions/number of respondents (30)

Exhibit IV-13g: Sweden

Index of Strengths and Weaknesses for Operating Environments



Note: Index value = Total mentions/number of respondents (30)

Exhibit IV-14: Europe

Suitability of Selected Hardware Products for Running Manufacturing Applications

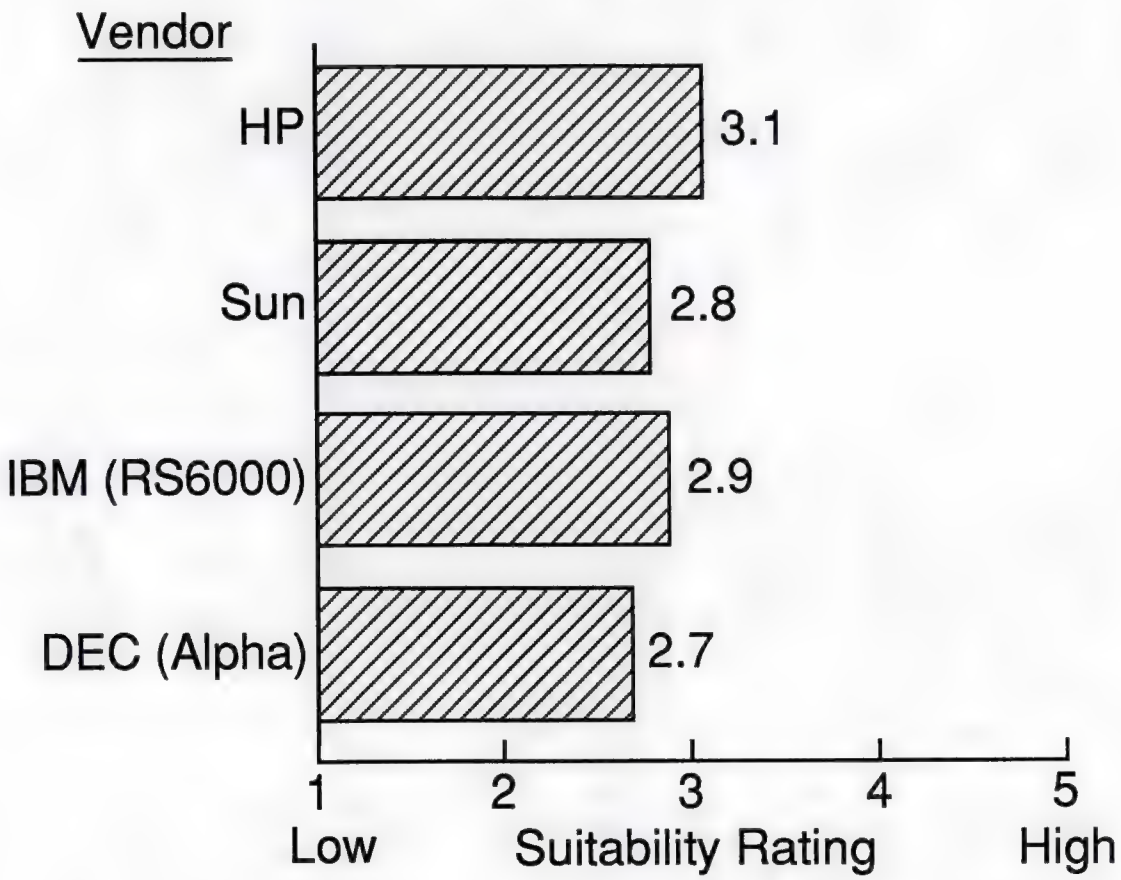


Exhibit IV-14a: U.K.

Suitability of Selected Hardware Products for Running Manufacturing Applications

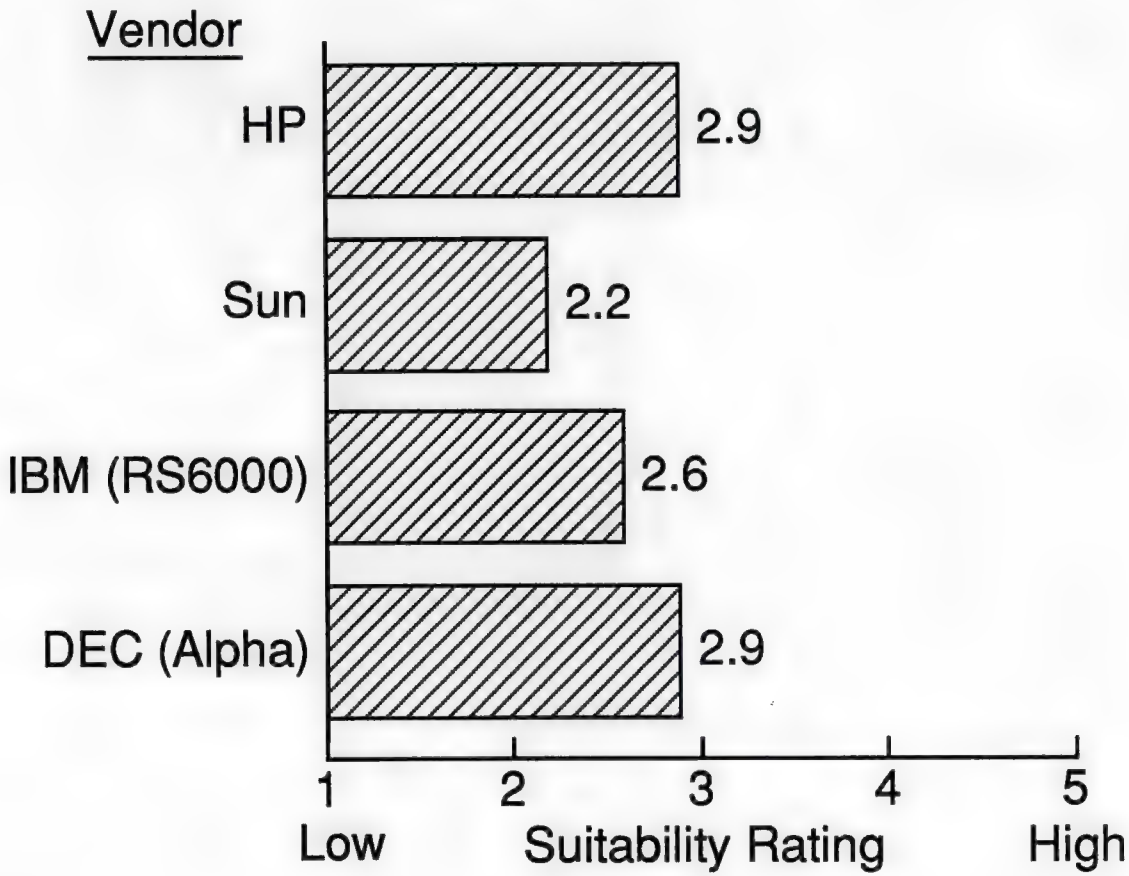


Exhibit IV-14b: France

Suitability of Selected Hardware Products for Running Manufacturing Applications

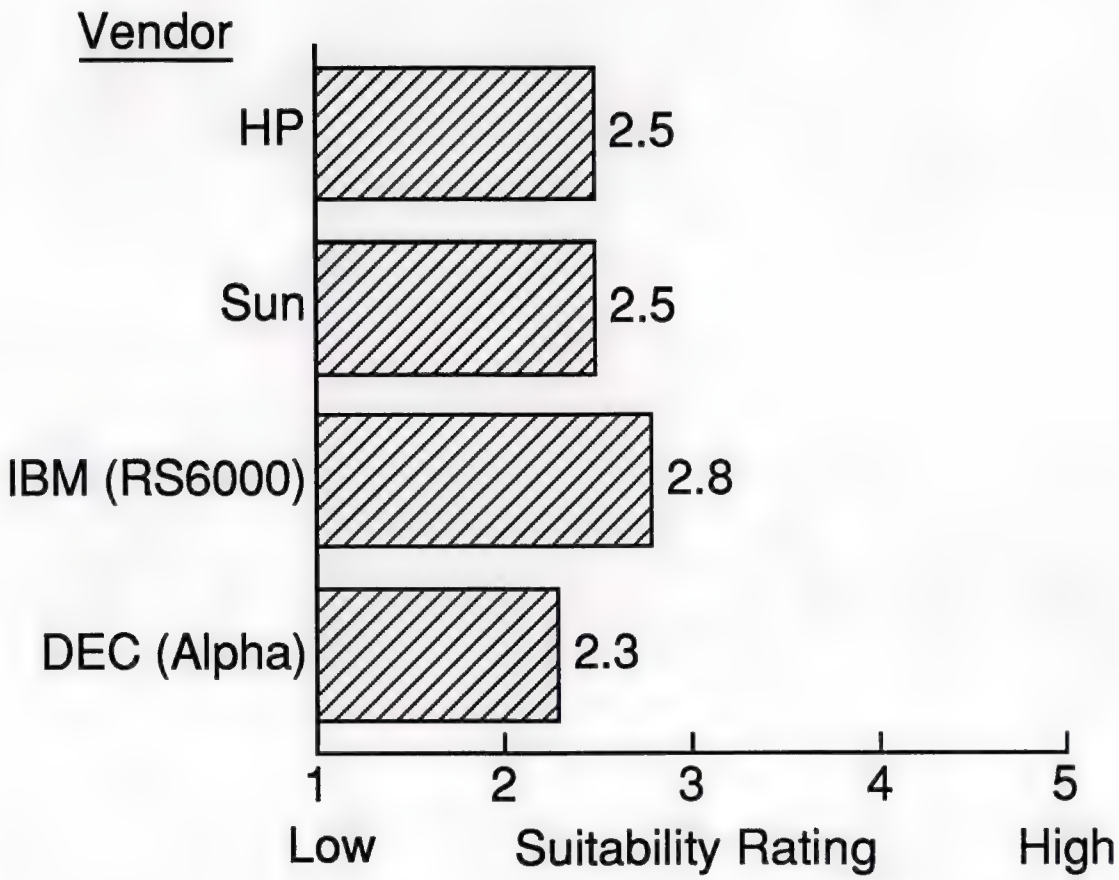


Exhibit IV-14c: Germany

Suitability of Selected Hardware Products for Running Manufacturing Applications

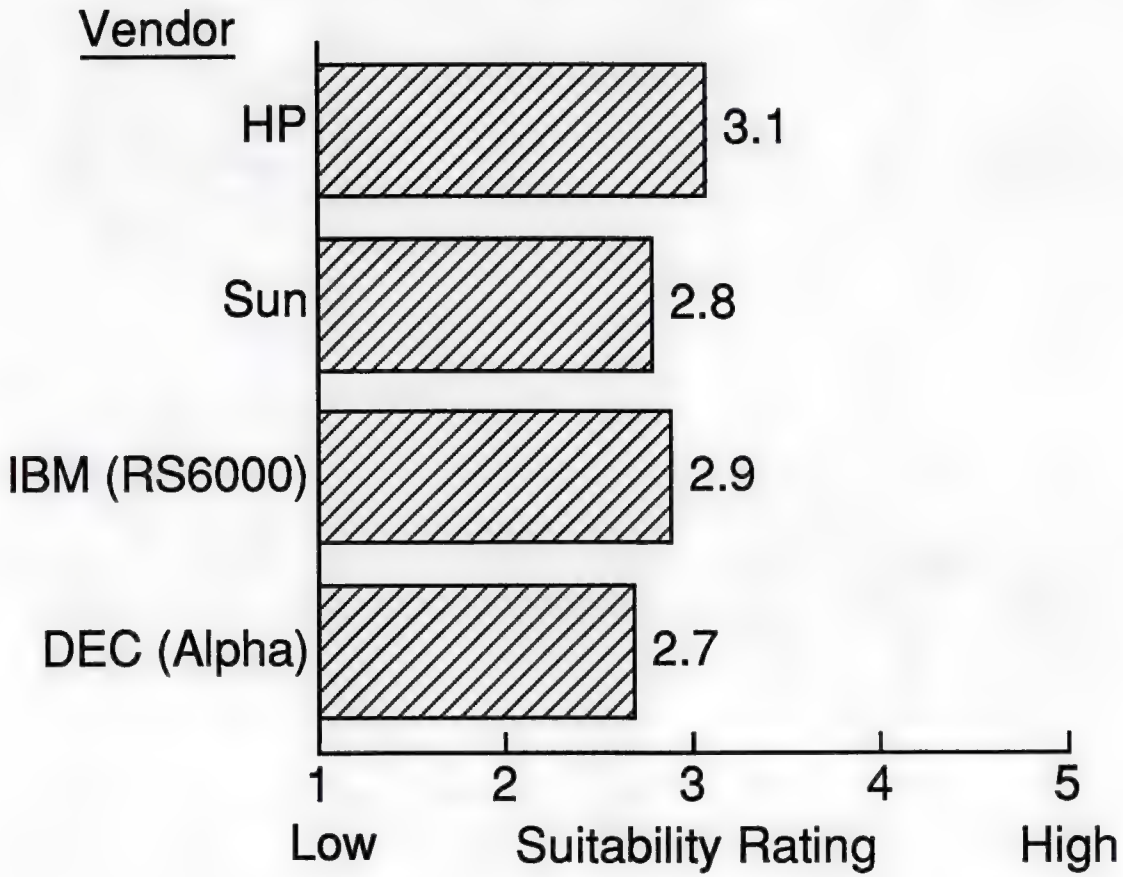


Exhibit IV-14d: Benelux

Suitability of Selected Hardware Products for Running Manufacturing Applications

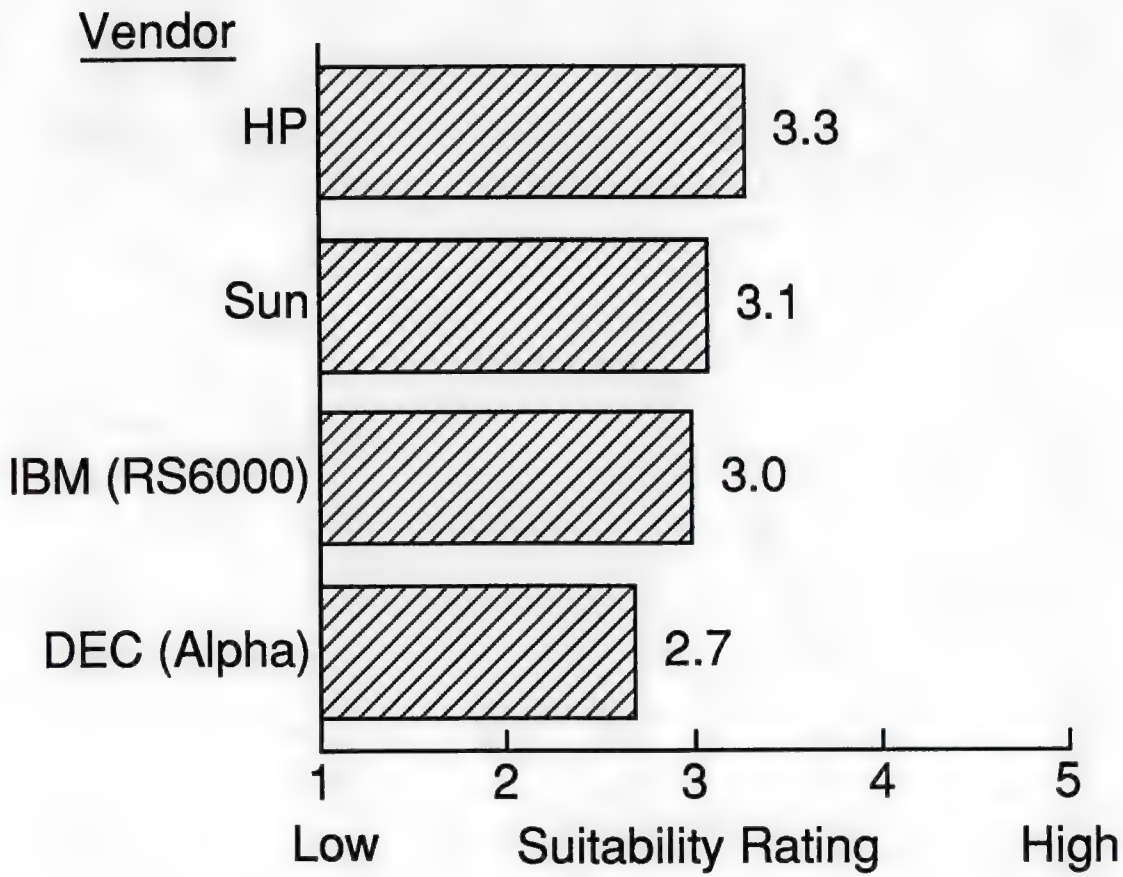


Exhibit IV-14e: Spain

Suitability of Selected Hardware Products for Running Manufacturing Applications

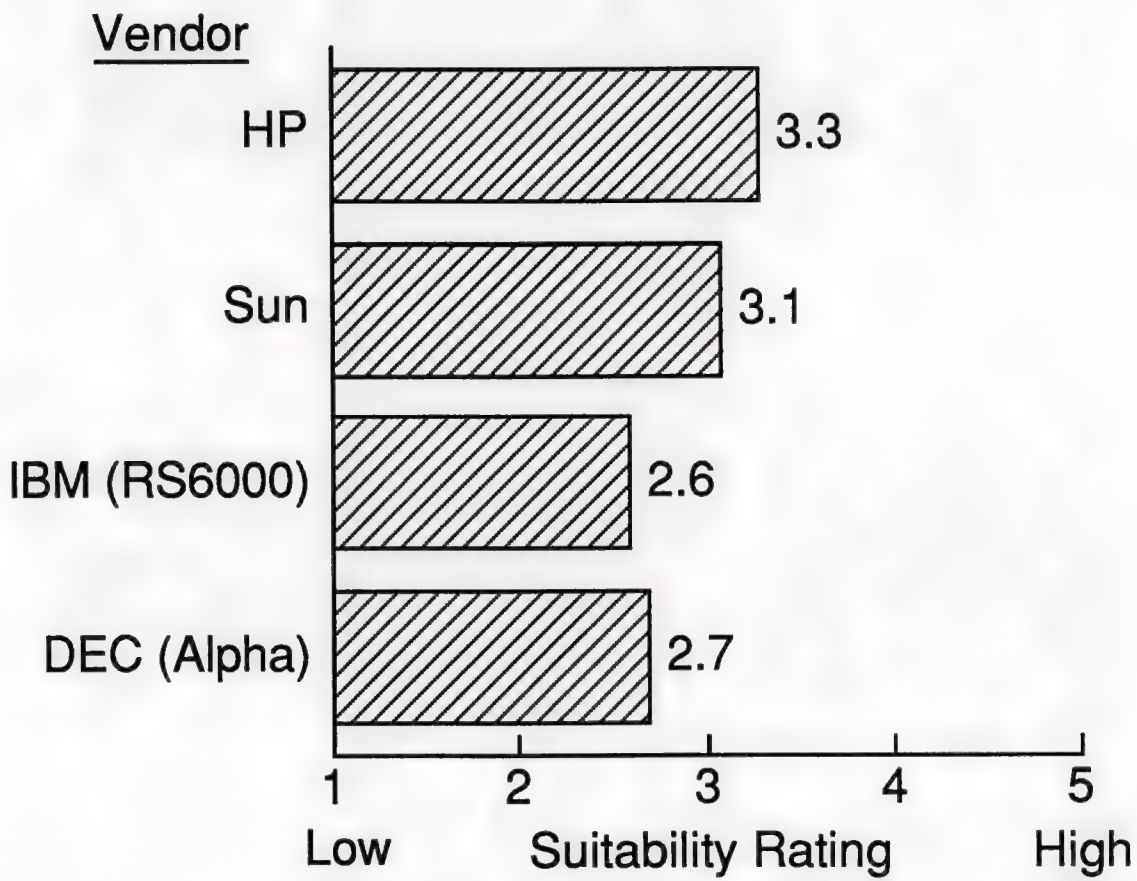


Exhibit IV-14f: Italy

Suitability of Selected Hardware Products for Running Manufacturing Applications

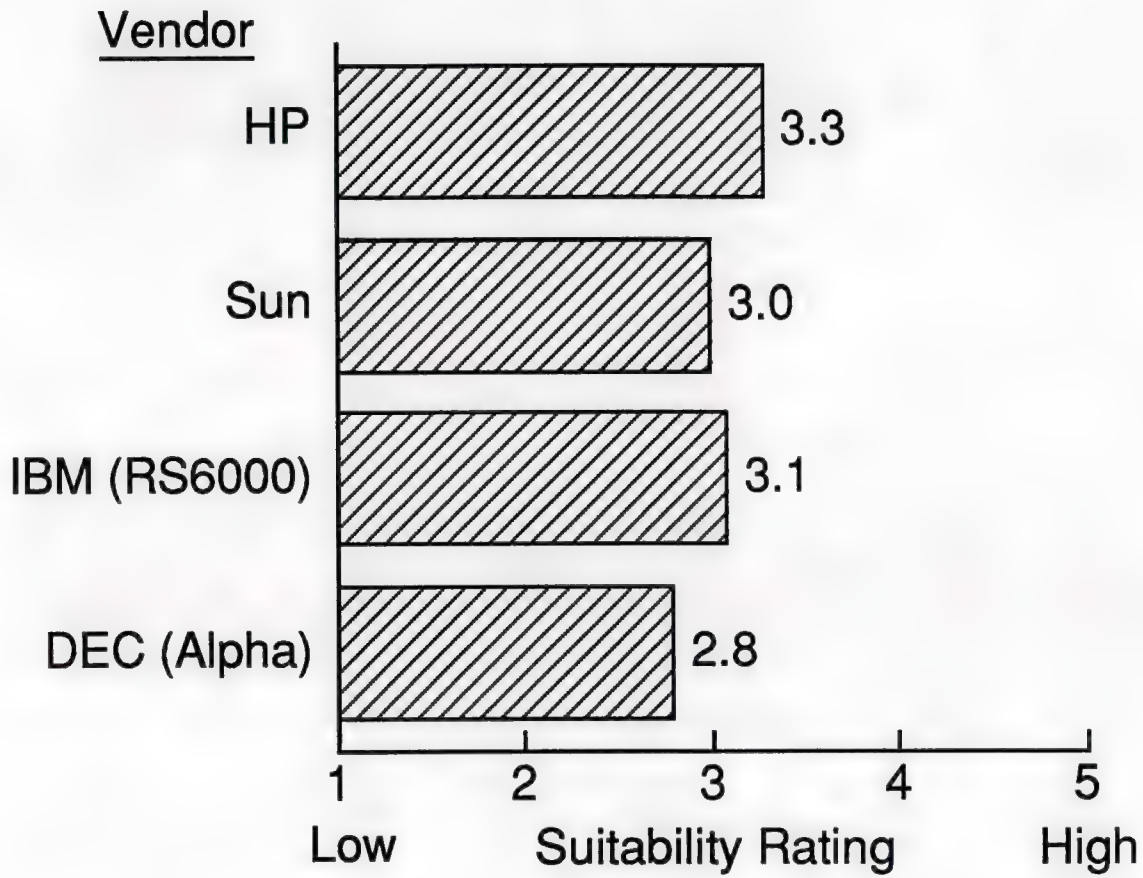


Exhibit IV-14g: Sweden

Suitability of Selected Hardware Products for Running Manufacturing Applications

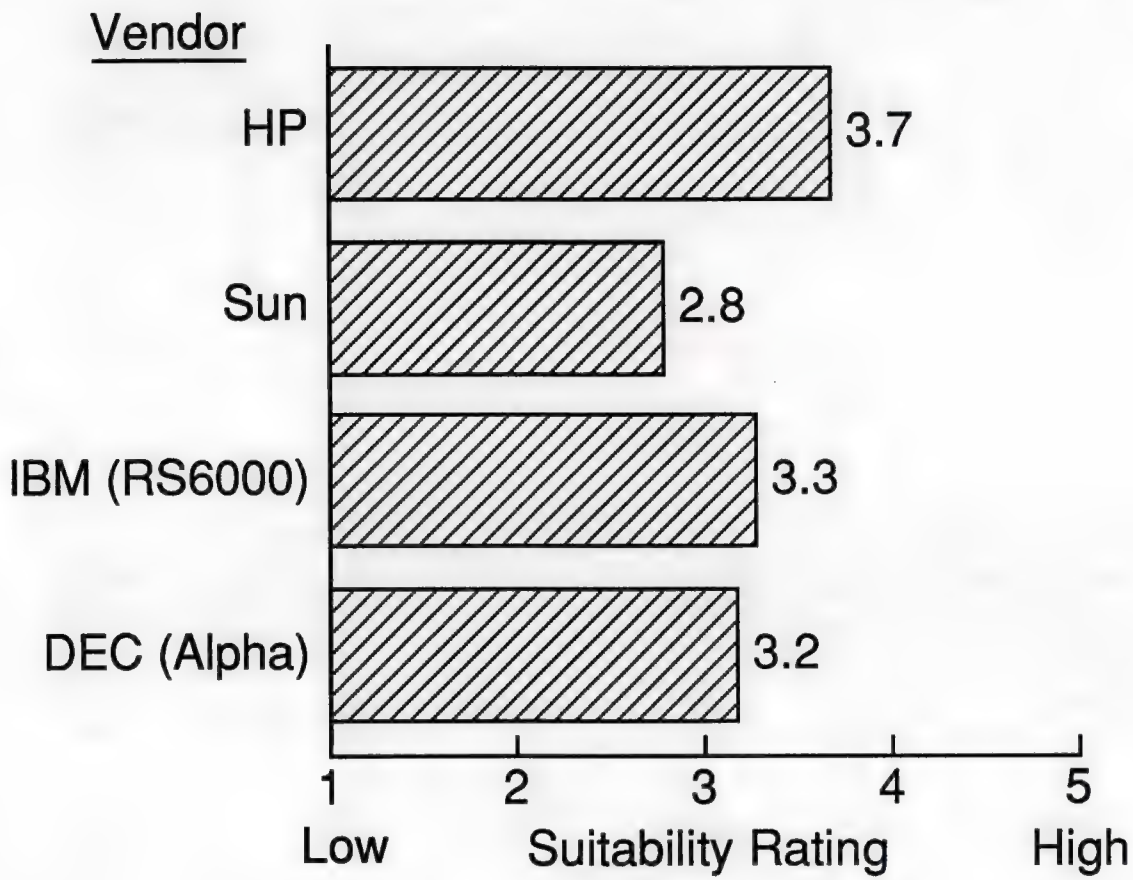


Exhibit IV-15: Europe

Suitability of Selected DBMS Products for Running Manufacturing Applications

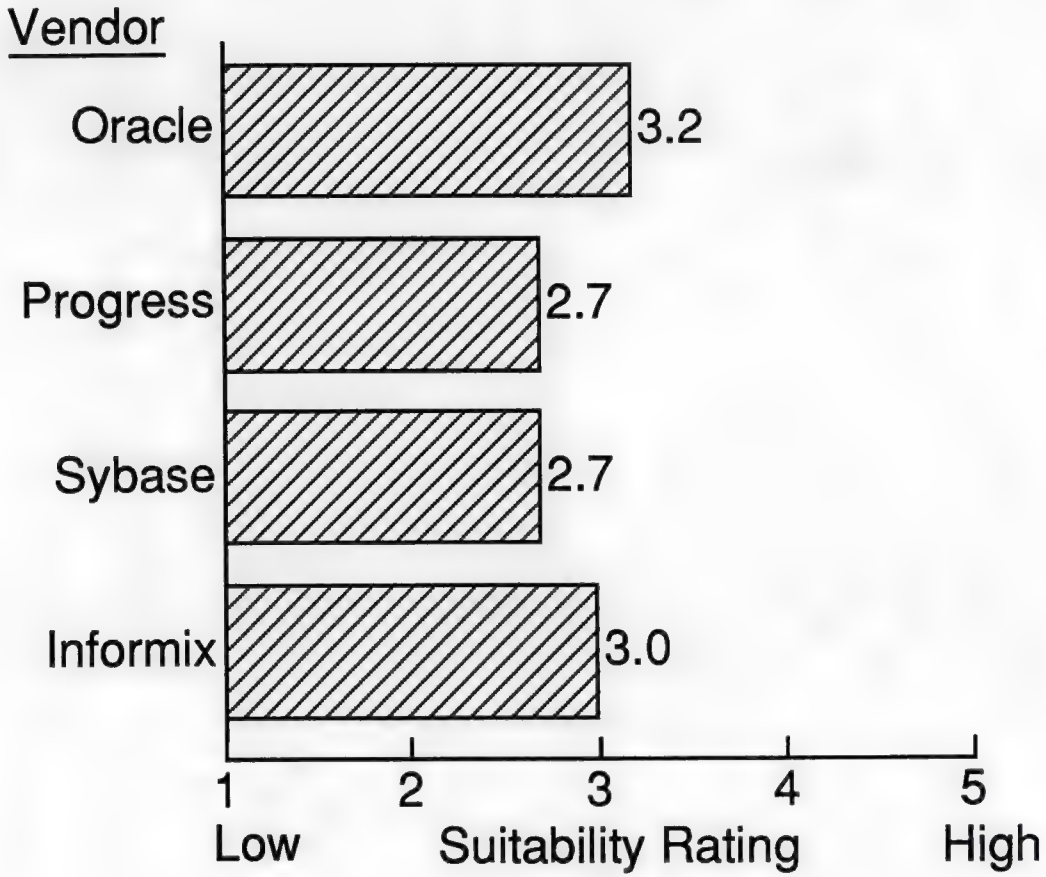


Exhibit IV-15a: U.K.

Suitability of Selected DBMS Products for Running Manufacturing Applications

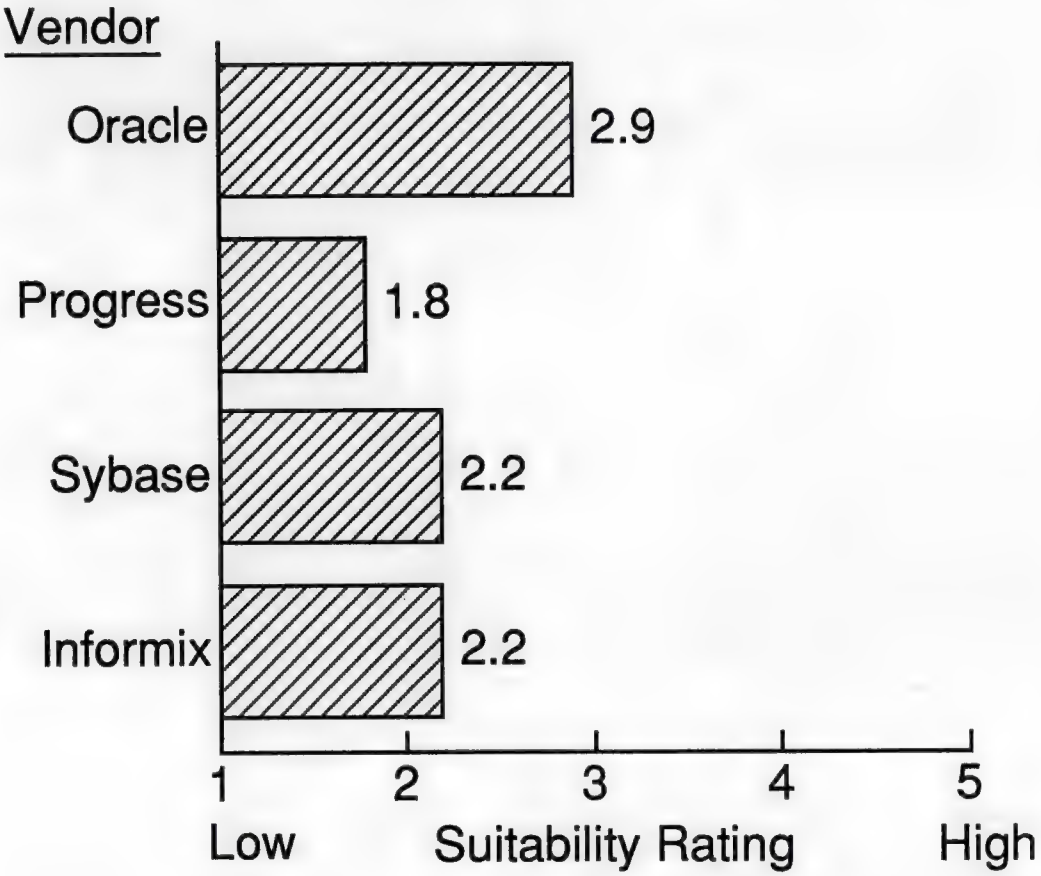


Exhibit IV-15b: France

Suitability of Selected DBMS Products for Running Manufacturing Applications

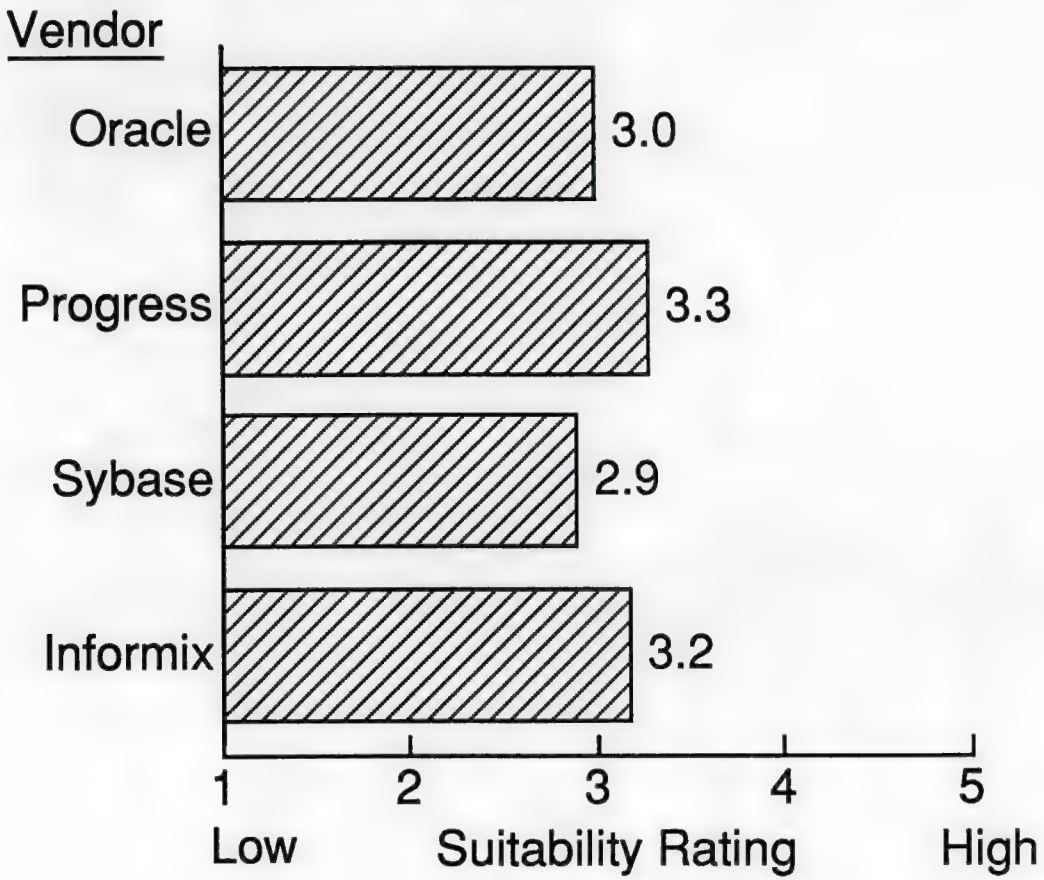


Exhibit IV-15c: Germany

Suitability of Selected DBMS Products for Running Manufacturing Applications

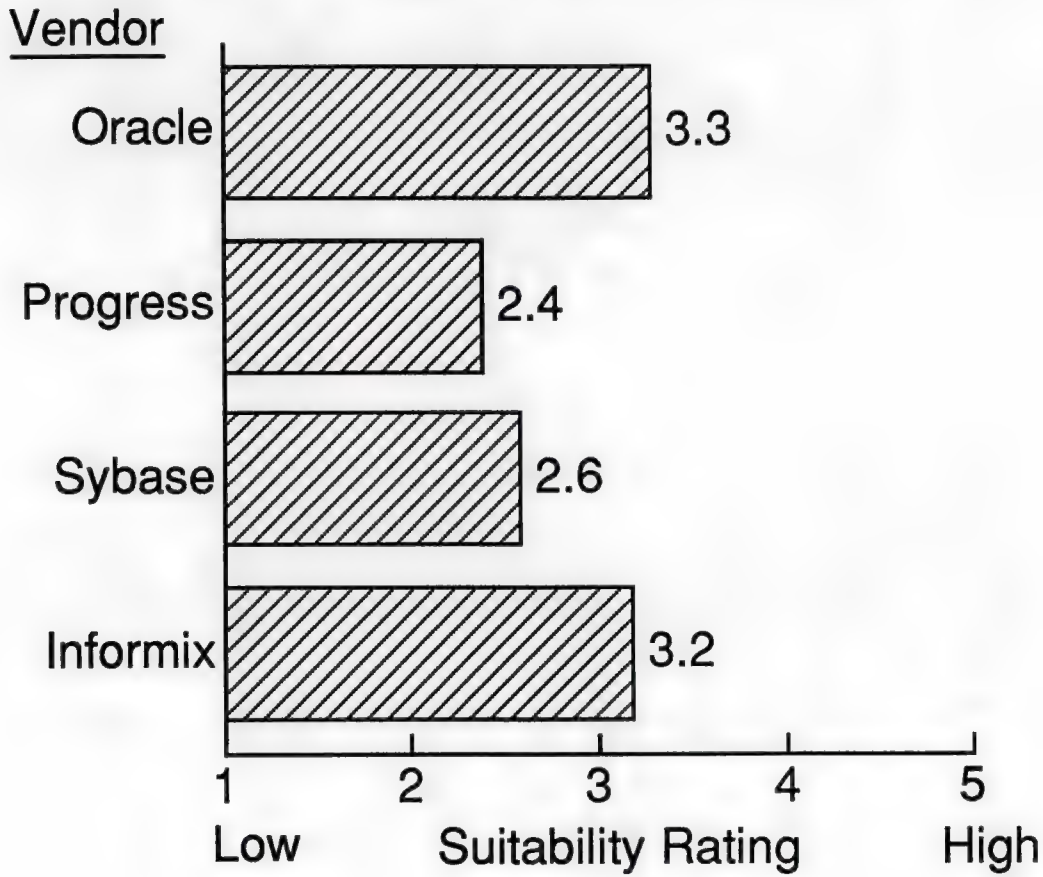


Exhibit IV-15d: Benelux

Suitability of Selected DBMS Products for Running Manufacturing Applications

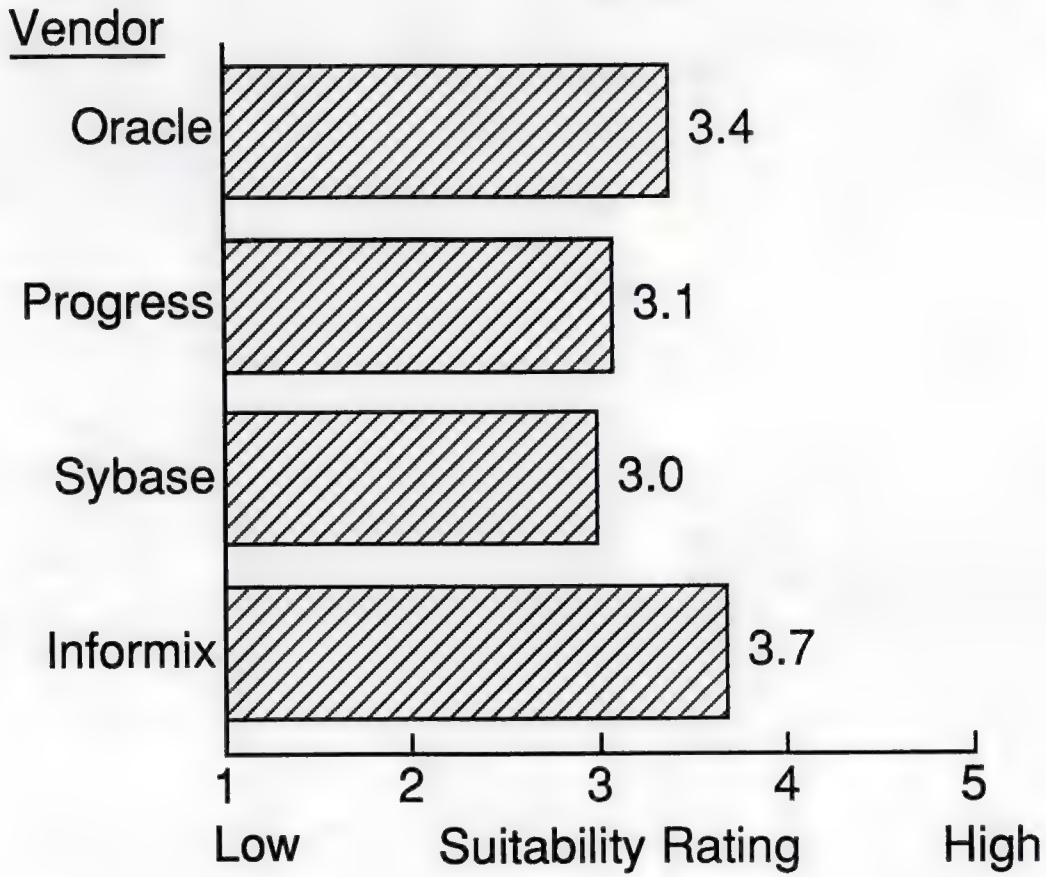


Exhibit IV-15e: Spain

Suitability of Selected DBMS Products for Running Manufacturing Applications

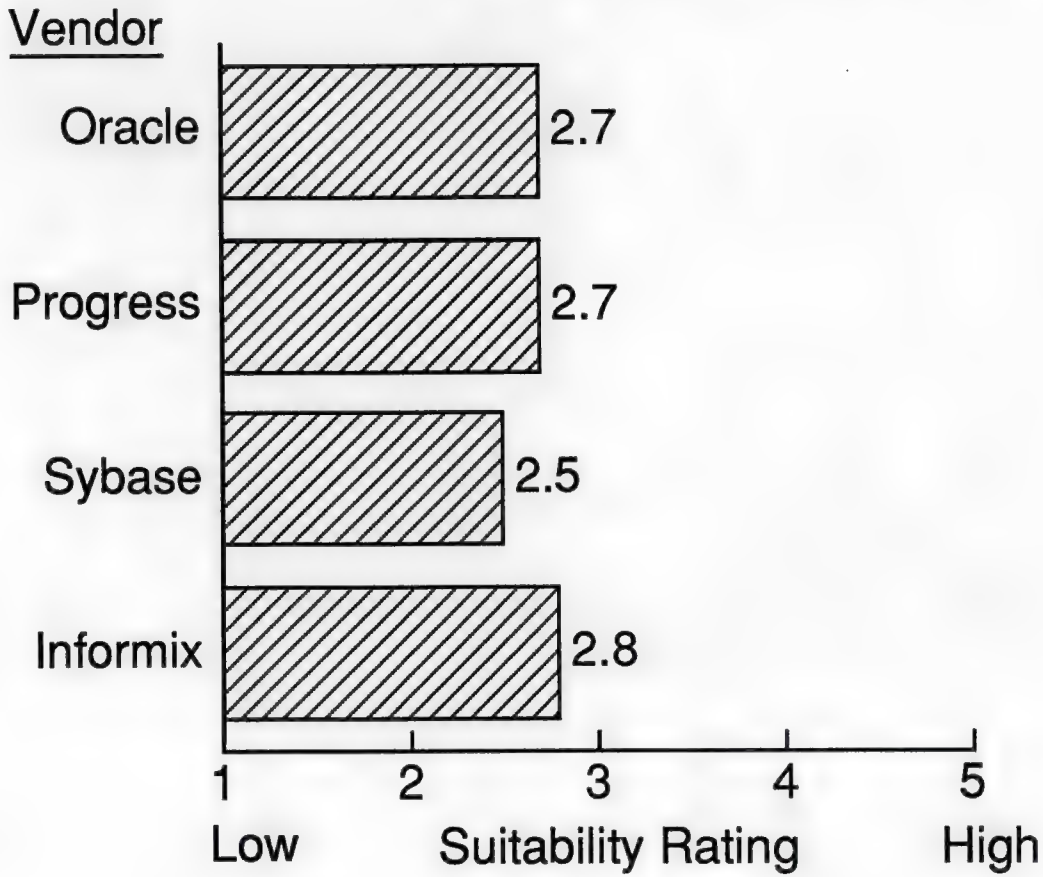


Exhibit IV-15f: Italy

Suitability of Selected DBMS Products for Running Manufacturing Applications

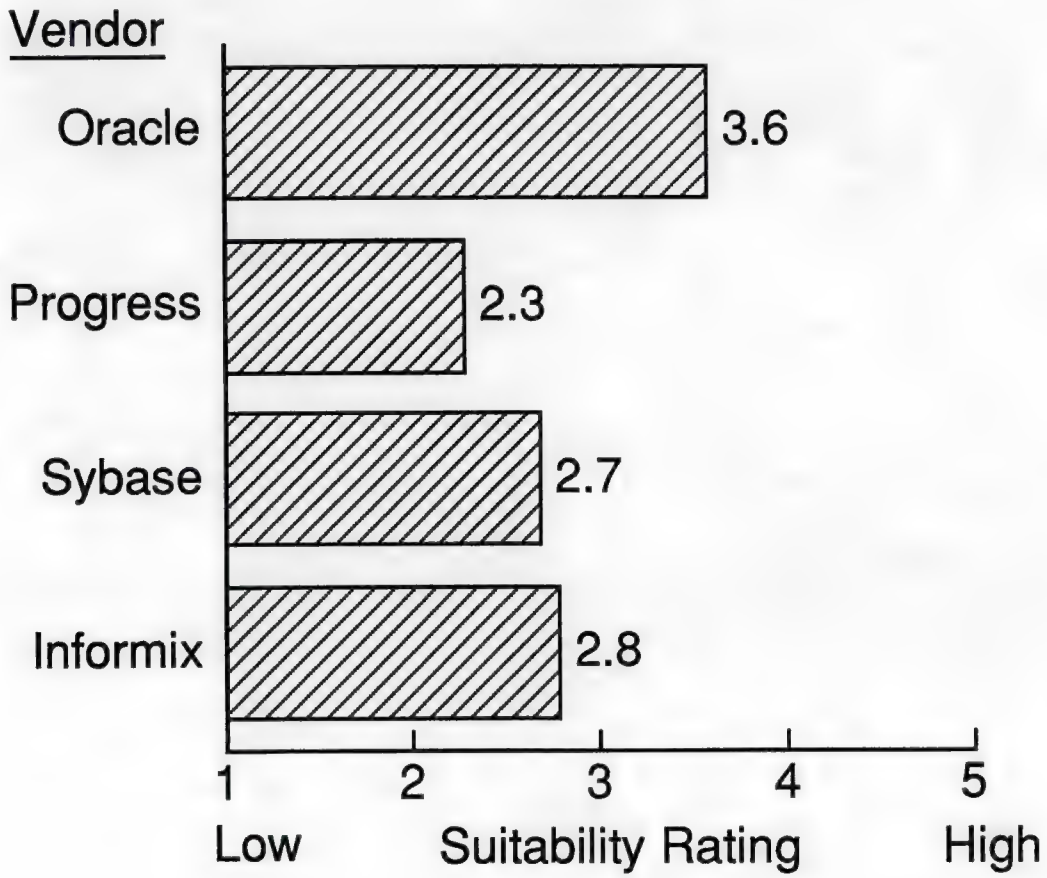


Exhibit IV-15g: Sweden

Suitability of Selected DBMS Products for Running Manufacturing Applications

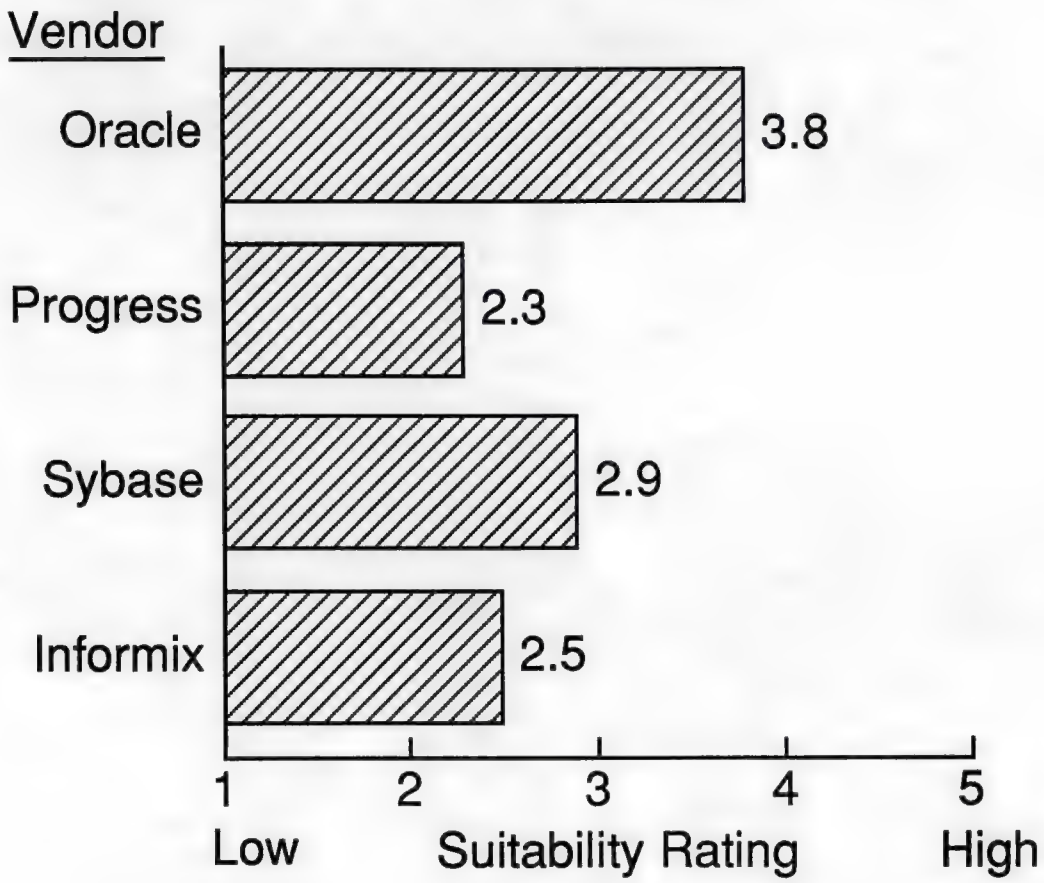


Exhibit IV-16

UNIX Hardware/DBMS Cited as "Especially Attractive" in Europe

(Matrix intersections show combinations cited.)

DBMS	DEC	HP	IBM	Sun	Other *	DBMS Only Named	Total
Informix	4	4	2	3		3	16
Oracle	6	10	2	2		5	25
Progress	1	2	4	1		0	8
Sybase	0	3	1	0	(c) 1	0	5
Ingres*	0	2	0	0	(d) 1	9	12
Other*	0	(a) 2	(b) 2	0	(e) 4	(e) 10	18
HW only named	6	7	4	9	(e) 28		54
TOTAL	17	30	15	15	34	27	138

* Products volunteered
(a) = Powerhouse, Express
(b) = Interactive, Seachange
(c) = DG
(d) = Unisys
(e) = See Exhibit _____

Exhibit IV-17

Other UNIX Hardware and DBMS Cited in Europe

Other Combinations (4)

DG/Magic

Bull/Baan

Siemans/Ingres

Siemans/Express

Other - Software Only (10)

Powerhouse (4)

Twinhead (2)

Magic (1)

Gembase (1)

Access (1)

Seachange (1)

Other - Hardware Only (28)

Siemans (10)

ICL (5)

Bull (4)

DG (3)

AS/400 (3)

Ericsson (2)

Unisys (1)

Exhibit V-1 A: United Kingdom

Advantages of Re-engineering an Application to Run Under UNIX

- If already in use, porting would maintain consistency
- Perceived advantage! Well proven software in modern platform
- You may already use and like the non-UNIX product.
- Can write Pascal, Cobol in any operating system.
- Were owned by X, they have an operating system ideology which could involve future move to UNIX.
- Consistency, short relearning process, security of proven software
- Well developed software which can operate on different platforms
- Reduced operating costs
- If ported again theoretically ease of migrating it to a different UNIX platform
- Lower hardware costs, wider choice of hardware applications
- More open systems environment, integration with other hardware made easier
- Openness, hardware interoperability
- Move it into a more open environment.
- Stability, well proven, less disruption

Exhibit V-1 B: France

Advantages of Re-engineering an Application to Run Under UNIX

- Easy migration, no loss of data, minimal retraining and parallel running
- Considerable - easier to change and move with technology, maintain current software with minimal change
- Able to run on different platforms
- Maintain existing structure, easier move from proprietary
- Good for multi-nationals, with different platforms, easier convergence of systems
- Provides a clear upgrade path for customers. Removes the fear of moving from established software.
- Maintain the body of a presumably stable package, documentation and manuals already exist, comfort factor
- Cost benefits, run the application on a smaller box. No reinstallation or parallel running. Reduce maintenance dollars.
- Existing users, fairly well debugged
- Possibly a cheaper option, more reliable and you may be familiar with it
- Reduce your annual operating costs. Bring better front end features to an established product.

Exhibit V-1 B: France (Cont.)

Advantages of Re-engineering an Application to Run Under UNIX

- Maintains vendor independence. More flexibility for customer, reduction in maintenance costs
- It would make the migration to UNIX easier.
- Maintain your existing software investment, easily installed, cost effective
- There are definite benefits if you want to retain your current data. No re-keying or training.
- Time saving, no parallel running on two platforms. Operators experience no changes.
- We have five years' work that can't be started from the beginning.
- A large amount of software is available so it wouldn't matter much.
- Retention of existing data, no retraining and re-keying of data, time efficient
- Already proven, existing track record, easy migration for customer

Exhibit V-1 C: Germany

Advantages of Re-engineering an Application to Run Under UNIX

- Easy to migrate, compatibility and interoperability, everything on one standard
- Proven and well-established
- Increased response times, lower processing times, quicker end of day routines and back-ups
- Easy, vendor is going UNIX, so it makes sense to port the good applications.
- There are hundreds of packages to choose
- Maintain your software investment. Faster implementation, reduction in annual running cost
- Ease of mind, it's always sensible to consider well-established packages.
- Something we're considering because UNIX versions are now available, it can allow you to transfer data.
- Maintain existing software investment, could be cost effective, known to operators, no retraining
- If the re-engineered package meets your specific requirement, why not buy it?

Exhibit V-1 C: Germany (Cont.)

Advantages of Re-engineering an Application to Run Under UNIX

- Able to run on a variety of platforms, important for a multi-national
- Better choice of manufacturing software, native UNIX is weak in shop floor type systems.
- Opens the market to different vendors, perhaps better user interfaces
- Better core product combined with Windows facilities, provides an operating software interface standard for application
- Software is proven, easier to migrate than start fresh, no change for users
- Proven, existing users, bug free
- It would allow you to move existing systems to UNIX, if necessary.
- Very important if moving from a proprietary arena
- No long implementation cycle, easy retraining and porting of data, financial benefit

Exhibit V-1 D: Benelux

Advantages of Re-engineering an Application to Run Under UNIX

- You could use existing (mature) software in a new environment.
- Greater appeal to other vendors' customers, faster installation, less training
- Maintain your software investment
- Commodity buying of hardware, development of client/server applications
- Easy to move platforms without having to change software
- Stable, no need for modification, solution oriented
- Safe option, already proven, more users, easy to market it
- It would be almost essential that we would port existing software. Eliminate new learning curve
- Stability, already in operation
- Provides continuity, saves considerable time and reduces existing system redundancy
- It would be established with reference sites proven and working.
- Would allow you to operate proven, well established applications
- There are advantages if you want to go UNIX. Portability
- Installations with different vendors' equipment can use the software. Important for multi-nationals

Exhibit V-1 D: Benelux (Cont.)

Advantages of Re-engineering an Application to Run Under UNIX

- It gives the best of both worlds, an established package operating under UNIX
- Greater choice of users, better user interfaces in UNIX
- Open the choice of platforms.
- Proven solution, stable, is debugged and will run efficiently
- Want easy transition from proprietary to UNIX, Larger companies need to run software on several vendors.
- Easy to use, better use and links to 4 GLASS
- In a multi-vendor environment, there may be existing software which you want to migrate to your new platform.
- No re-keying of data, quicker reinstallation without parallel running
- If you have a stable product, migrating to UNIX is the ideal solution.
- It would allow users to take advantage of existing installed UNIX equipment.
- Easy migration for customer, increase performance and processing times
- Tried and trusted software, already debugged and proven
- Well established software already in operation, very sound back-up and security procedures
- Would allow the customer an easy migration path to UNIX, no readying or re-training

Exhibit V-1 E: Spain

Advantages of Re-engineering an Application to Run Under UNIX

- It would offer and upgrade path from proprietary to UNIX, could make the UNIX decision easier
- Provides an upgrade path or downsizing option if you are already running the application
- Better workhorse software, familiarity with existing users
- Reduced annual operating cost
- Flexibility of hardware platform
- Maintain software investment, transparent to the operator, tried and tested
- The best production software has non-UNIX origins
- Consistency for the user, software may be well proven and user is satisfied
- Many, seamless integrated from proprietary to UNIX, maintain current software functionality and file structure
- Easy to install, well proven, large number of users
- Continue to use software that you use too, and confident with
- Easy migration, maintain existing software, could be cost effective

Exhibit V-1 F: Italy

Advantages of Re-engineering an Application to Run Under UNIX

- A large percent of the UNIX applications started life as non-UNIX.
- Longer established and more proven
- It is very transparent.
- Operating in an open environment
- Ease of integration, familiarity
- Existing integration
- Many, if you want to move existing software
- You have mature, well established software operating in a new environment.
- Yes, if it has a reasonable user base and is in demand, may be necessary to prevent your customer from buying
- It's transparent. The user wouldn't notice any difference.
- Allows you to migrate easily in a downsizing exercise, maintain continuity
- Numerous, maintain existing data. Program familiarity, time saving, cost benefits

Exhibit V-1 G: Sweden

Advantages of Re-engineering an Application to Run Under UNIX

- Whole modules immediately available, less rapid culture change
- Open environment, software well developed, plug in and go
- Benefit of well proven software in a new open system platform
- Good ideas if you can port existing data and files
- Maintain existing file, structures and data, improve rather than traumatic change
- Easy move if you are already using the application, no retraining, fast adjustment
- In our case it would allow us to maintain the stability of AS/400 software.
- Easier to move platform, keep software you are used to
- If application has what you need and if benchmarks show no performance deterioration
- Has advantages if you can move existing files
- UNIX may be suitable for smaller departmental systems with updating to AS/400
- General advantage of portability
- Price, i.e., not written software from scratch
- It may be a cheaper option if you have already decided to go UNIX
- Time, cost, data integration

Exhibit V-2 A: United Kingdom

Disadvantages of Re-engineering an Application to Run Under UNIX

- UNIX architecture was designed for UNIX performance. Lack of comparative features, probably better off with new software GUI may not be as good
- Most non-UNIX software is written to run on a specific operating system.
- Emulators aren't efficient.
- Complex, too much of a change, it's okay to migrate from S/36 to AS/400 but UNIX is a different system .
- Native software has superb features re-engineered applications are unlikely to have.
- It doesn't matter for what environment it was originally written
- Performance loss
- No security, access control
- Disaster recovery
- Deciding if it is necessary in the first place
- Cost, if relatively few installations too this option
- Cost training, etc., no operational advantage
- Loss of performance
- Will it perform any better than other UNIX products that are already on the market?
- Lack of functionality and SQL features, performance decrease in emulated programs

Exhibit V-2 B: France

Disadvantages of Re-engineering an Application to Run Under UNIX

- It may be a good idea to install new software when moving to UNIX
- It may only be a temporary phase. Most companies will eventually replace the applications.
- Applications perform better (faster) in a native mode.
- Are you not re-engineering old technology?
- If it operates well in non-UNIX, why move it?
- It makes you complacent. You may want to evaluate new software if you can easily port systems.
- Most ported software still use old programming techniques.
- Development with 4GLS is slower.
- Old software on new hardware, not always an efficient combination
- Many, why would you want to do it any what do you expect to achieve?
- Other than the ability to transfer existing drawings, I don't consider porting to be an issue.
- Wouldn't have the same user interfaces as a UNIX product, different programming tools for on-going development

Exhibit V-2 B: France (Cont.)

Disadvantages of Re-engineering an Application to Run Under UNIX

- Performance, you may only be extending the product life for a short term.
- None really, perhaps it may run slower.
- If there is no operational need, I would say no.
- May not fully support the UNIX/Windows NT command structure. Does it run true 32 and 64 bit?
- May be unsuitable in features, proven and well tested, may also mean old and out of date
- Native software platforms better on UNIX platforms?
- You have to consider how closely it will reflect your existing software.
- You must consider choice. If good software is already available, here is no need to re-port, it would seem to be logical.
- No disadvantages other than can it technically be done for non-UNIX environment, if it's an emulator, it may have performance problems.
- An application solution isn't any better by virtue of running under UNIX.

Exhibit V-2 C: Germany

Disadvantages of Re-engineering an Application to Run Under UNIX

- It's still a major task and may not prove to be effective.
- May be expensive and still lack the "softness" of pure UNIX package
- Have to learn the new operating system
- They lack functionality, particularly screen based, compared to native UNIX and UNIX 4 GLS.
- Changes in operating and daily procedures
- You will not achieve 64 BIT RISC processing easily.
- Critics argue that it's still old techniques and that custom development is slow.
- Why would you want to do it? In reality, what would you achieve?
- Can it run true 64 BIT RISC? May not be any better than the large choice of native software.
- UNIX doesn't make it any better.
- Applications are slower than pure native
- It needs extra memory and disk to run it sufficiently
- New daily procedures, UNIX operating systems needs to be managed properly.

Exhibit V-2 C: Germany (Cont.)

Disadvantages of Re-engineering an Application to Run Under UNIX

- WAN manager capabilities are weaker
- May not integrate as easily with 4GL
- May lack the user interfaces of pure UNIX, probably written with 3 GL in mind
- Five year costs could be quite high, is performance going to improve?
- You can find everything you want with UNIX written applications.
- Development capabilities are restrictive
- You may not be able to optimism the benefits of new technology if the software is written under old program techniques
- It's old software, not written to run Windows NT, too many differences
- There is no significant operational benefit to be gained.
- There are more for existing AS/400 users.
- Could it spell the end of the mainframe?

Exhibit V-2 D: Benelux

Disadvantages of Re-engineering an Application to Run Under UNIX

- Performance wouldn't be as good as a true UNIX application
- Increased system management costs, loss of control
- It may not be less expensive "all told." It would take a long time to port large mainframe systems.
- There are performance issues with regards to 32 BIT and use of cache
- Costs may not be less than buying native products. UNIX will not make your business more profitable.
- Temporary life extension of an old product
- Software doesn't tend to be leading-edge, so whether it's UNIX or not is not always an issue
- Large choices of similar native software increase the number and would confuse the buyer
- It doesn't matter where it originates from, providing it is an open system.
- You may still be locked to a particular supplier.
- Would it be modern and could it offer any features that you wouldn't otherwise get?
- Already large number of native packages
- Potentially slow running speeds
- New architecture and operating systems
- If they operate in an emulation mode, performance can be affected

Exhibit V-2 D: Benelux (Cont.)

Disadvantages of Re-engineering an Application to Run Under UNIX

- UNIX license fees are very high for larger systems.
- Re-porting can have processing and performance problems.
- Performance on a UNIX box, re-training and installation costs
- Mature may mean old technology
- Slower than native applications, user interfaces would need to be redesigned
- You port the old routines with you. It may lack the GUI of native UNIX software.
- Operationally slower, you may lose the performance advantage of 32 BIT RISC.
- Non-UNIX software can lose the technological benefits of the hardware.
- Most vendors disguise the disadvantages, claiming that they are transparent to the user.
- CAD isn't an integrated product really, so porting to UNIX has limited benefits.
- How efficient is a program under emulation?
- Differences in the development culture, you may be committed to the vendor who can operate migration.
- Run time, command and error messages would differ
- Some companies may want to start "a fresh," so there's no advantage in moving an older package to UNIX.

Exhibit V-2 E: Spain

Disadvantages of Re-engineering an Application to Run Under UNIX

- The software functionality would be no better.
- Would only appeal to customers in an upgrade situation.
- It would provide no advantages to a new installation of UNIX.
- Difficulty in porting, depending if it is necessary in the first place
- Lack of controlled access, disaster recovery
- Loss of performance, product wasn't meant for UNIX
- Assumes that the non-UNIX product has the operational requirements that you need. Processing speeds are slow in comparison, languages basic are now "old hat"
- Would it do anything that you wouldn't already get from pure UNIX? Cost and retraining staff, short term measure, old software on new technology
- Performance in UNIX, lack of user screen interfaces, would it have anything that wasn't available in UNIX?
- If you've decided on UNIX, you're better to consider true UNIX software. Could tie you to that supplier, no support alternatives

Exhibit V-2 F: Italy

Disadvantages of Re-engineering an Application to Run Under UNIX

- Performance may suffer. Menu and screen layouts would differ. Too difficult to change, support is a problem, cost
- How well will it run and how closely does it resemble the original product
- Could be costly
- Cost!
- It may not be necessary.
- It depends on how good the application was. If it was rubbish, moving it to UNIX won't help.
- Short term measure as the software will age quickly
- Why do it? There us no shortage of native UNIX software.
- Cost, time, new skills
- Costs, old software, performance would not be fully utilized
- Front end interfaces need to be all re-written
- Most of the functionality is available in other UNIX software.

Exhibit V-2 G: Sweden

Disadvantages of Re-engineering an Application to Run Under UNIX

- May not achieve sufficiently close match to our functional and operational needs
- More effort to change than a pure migration, may achieve better operational benefits with pure UNIX environment
- Porting is prone to problems. It may not be any better or functional to justify doing it
- Cost budget may not be good enough, poor performance
- Still old software, future development question
- How close does the UNIX reflect the non-UNIX? We see no benefits in UNIX just yet. Not enough to justify the move, would there be any performance difficulties?
- If it was transparent to us, I don't know if it would matter, Is still old and may not compare with newer products
- Most reported software tends to have been proprietary and may only be suitable for 3 GL integration
- Lacks flexibility of native software, must balance between convenience of ease of migration

Exhibit V-2 G: Sweden (Cont.)

Disadvantages of Re-engineering an Application to Run Under UNIX

- Which generic version of UNIX do you port it to? May not be compatible to UNIX variants
- Maintainability
- New technology, makes better use of 4GLS, it may suffer response speed timings
- Wouldn't use new development techniques such as Windows, seamless integration, etc.

Exhibit V-3 A: United Kingdom

Advantages in Re-engineering from AS/400 to UNIX

- If already in use, porting would maintain consistency
- Move from proprietary to UNIX would be easier
- Well developed software which can operate on different platforms
- Reduced operating costs
- Allow already established industry software to operate in the most modern environment
- Lower hardware costs, wider choice of hardware applications, easier to move to RS/6000
- More open systems environment, integration with other hardware made easier
- Openness, freedom from hardware interoperability
- More it into a more open environment Make the customer seem less isolated

Exhibit V-3 B: France

Advantages in Re-engineering from AS/400 to UNIX

- Allows mid-range customers to move from IBM
- This has been done and is very popular. Customers can easily move from IBM
- Retain existing file structure and data, operating procedures remain the same.
- Good software exists. Would make sense to move to UNIX
- First class software available, years of development
- Open up alternative platforms, namely RS/6000 more, competition for your business
- Provides a clear upgrade path for customers, removes the fear of moving from established software
- Large AS/400 user base, would be a good market, "rich pickings"
- Cost benefits, run application on a smaller box on reinstallation or parallel running, reduce maintenance costs
- You can move from IBM.

Exhibit V-3 B: France (Cont.)

Advantages in Re-engineering from AS/400 to UNIX

- Manufacturers' software, unlike database products, is very mature, with strong offerings from IBM agents, I doubt there's be any benefits
- It brings sound proprietary products into the open market. Would be great comfort to dissatisfied IBM customer
- Allow AS/400 customers to move to an alternative other than the RS/6000
- Easy migration to RS/6000, nothing else
- There are definite benefits if you want to retain your current data.
- If you want to go UNIX, you might as well move with established software

Exhibit V-3 C: Germany

Advantages in Re-engineering from AS/400 to UNIX

- Every vendor is going UNIX. It makes sense to port the good applications.
- You will get more performance on comparable UNIX processor, larger choice of 4GLs
- You could move from IBM
- Is proven popular with unhappy IBM customers, means they can leave "Big Blue" blue.
- Better core product combined with Windows facilities, provides an operating system interface standard for application portability.
- Proven, existing users, bug free
- It would allow you to move existing systems to UNIX, if necessary
- Most of the best applications have come from these origins
- Very important if moving from a proprietary arena
- It only makes sense if you want UNIX.

Exhibit V-3 D: Benelux

Advantages in Re-engineering from AS/400 to UNIX

- AS/400 has the best applications in the world.
- It would be almost essential that we would port existing software, eliminate new learning curve
- It would be established with reference sites proven and working
- Large base of AS/400 customers who see UNIX as their ultimate goal
- Able to run RS/6000, reduce annual operating cost
- Open the choice of platforms, nothing else, IBM isn't pushing it.
- Large population of AS/400 customers, many of them want to implement a UNIX strategy
- Very good software exists for the AS/400
- AS/400 has a strong culture. This would be essential in moving AS/400 user to UNIX
- Large number of AS/400 sites with in-house developed software, this could be ported to UNIX

Exhibit V-3 E: Spain

Advantages in Re-engineering from AS/400 to UNIX

- It would offer an upgrade path from proprietary to UNIX. Could make UNIX decision easier,
- Better workhorse software, familiarity with existing users
- Reduced annual operating cost, more power per dollar
- Flexibility of hardware platform

Exhibit V-3 F: Italy

Advantages in Re-engineering from AS/400 to UNIX

- There is a lot of existing software which AS/400 customers would most certainly want to port to UNIX
- Longer established and more proven
- Easier migration from AS/400
- In theory you could take existing software applications

Exhibit V-3 G: Sweden

Advantages in Re-engineering from AS/400 to UNIX

- Easy migration, maintain continuity, no re-buying, better performing hardware
- Would allow us to maintain stability of AS/400 software
- Advantages if you can move existing files
- UNIX may be suitable for the smaller departmental systems with updating to the AS/400
- Easier migration path from AS/400 to RS/6000, allow you to maintain some consistency
- General advantage of portability
- Price
- Cheaper if going to UNIX

Exhibit V-4 A: United Kingdom

Disadvantages in Re-engineering from AS/400 to UNIX

- GUI may not be ask good.
- No UNIX expertise, move would be traumatic, no commercial benefit
- Most non-UNIX software is written to run on specific open systems. Emulators are efficient.
- Complex, too much of a change, it's okay to migrate from S/36 to AS/400, but UNIX is a different system completely.
- It doesn't matter for what environment it was originally written, performance loss
- Cost, training, etc., no operational advantage
- Loss of performance
- Will it perform any better than other UNIX products that are already of the market

Exhibit V-4B: France

Disadvantages in Re-engineering from AS/400 to UNIX

- I believe that the performance isn't any better that what would be achieved on an equivalent AS/400.
- If it operates well in non-UNIX, why move it?
- Most IBM sites are very heavily Cobol and RPG
- There's no need for a happy AS/400 to move to UNIX. What are the real benefits, not the perceived one? IBM "comfort factor" would disappear, they don't strategically attempt to replace AS/400 and S/36 with RS/6000.
- More than one prime contractor, loss of RPG
- A large number of applications run extremely well on AS/400. You take a risk if you decide to move.
- Other than the ability to transfer existing drawings, I don't consider porting to be an issue. IBM would push them towards AIX.
- Bad news for IBM
- These new UNIX platforms don't perform any better than a well configured AS/400.
- May be unsuitable in features, proven and well tested may also mean old and out of date
- Would the perceived benefits justify it? In all instances there are marketing advantages to resell

Exhibit V-4C: Germany

Disadvantages in Re-engineering from AS/400 to UNIX

- Most sites will remain AS/400, easy to migrate, compatibility and interoperability, everything on one standard
- They lack functionality, particularly screen based, compared to native UNIX and UNIX 4 GLS
- Lose a lot of the AS/400 benefits
- AS/400 has probably the best software packaged applications in the world, why would you change to UNIX?
- No benefit, AS/400 us a better operating system
- The comfort of IBM has gone.
- Lower level applications
- May lack user interfaces of pure UNIX, probably written with 3 GL in mind
- Five year costs could be quite high, is performance going to improve?
- Performance, flexibility will not be as good
- Development capabilities are restrictive, you would just limit yourself to IBM resolvers and software houses
- You may not be able to optimize the benefits of new technology if the software is written under old techniques
- May have to remain with the same software house
- There are more for existing AS/400 users

Exhibit V-4D: Benelux

Disadvantages in Re-engineering from AS/400 to UNIX

- Would you actually achieve any benefits?
- Many production managers are secure with AS/400
- Would it be modern and could it offer any features that you wouldn't otherwise get
- Potentially slow running speeds
- Is it worth the hassle and would it make the application perform any better? I doubt it.
- Performance on a UNIX both, retraining and installation costs, I have no compelling reason to do it.
- Loss of RPG and Cobol capabilities
- IBM is resisting it.
- IBM is still pushing the AS/400 and giving strong arguments for customers to remain, at expense of RS/6000
- Most AS/400 sites love RPG. Would they love this?

Exhibit V-4E: Spain

Disadvantages in Re-engineering from AS/400 to UNIX

- AS/400 is the most widely installed mid-range system in the world
- Would only appeal to customers in an upgrade situation
- Difficulty in porting, Lack of controlled access, disaster recovery
- Loss of performance, product wasn't meant for UNIX
- If you've decided on UNIX, you're better to consider true UNIX software
- Many, UNIX promises a lot, but delivers very little extra benefit

Exhibit V-4F: Italy

Disadvantages in Re-engineering from AS/400 to UNIX

- The architecture is different. Whether it is a real disadvantage would remain to be seen.
- It makes good sense if an AS/400 user is upgrading to UNIX.
- Programming methods are dated
- There is no commercial or operational advantage

Exhibit V-4G: Sweden

Disadvantages in Re-engineering from AS/400 to UNIX

- Various five-year cost projections have shown UNIX to be more expensive than AS/400.
- Maintainability
- AS/400 is POSIX compliance, why move to UNIX for the sake of it?
- Wouldn't use new development techniques such as Windows, seamless integration, etc.

Exhibit V-5 A: UK

Advantages in Re-engineering from MS-DOS to UNIX

- If already in use, porting would maintain consistency
- Multi access no longer restrict to PCs using existing VT terminal
- You may already use and like the non-UNIX product.
- Multi user capabilities cost effective simple to use
- UNIX gives more open architect multi-user more powerful hardware platform
- Central sharing of information
- Common interface, transfer to main hardware platform
- Well developed software which can operate on different platforms
- Multi-user compatibility
- Maybe more of future commitment
- Lower hardware costs, wider choice of hardware applications
- Multi-user, all on one platform, use terminals instead of PCs
- Better hardware range, manufacturer independence, improved performance
- Move it into a more open environment
- Cheaper option, allow all software to have central server
- If everything is the same. I see no disadvantages in doing it

Exhibit V-5 B: France

Advantages in Re-engineering from MS-DOS to UNIX

- Large choice of software. DOS is being used in almost every company.
- Good base for Windows NT, high awareness of Microsoft products
- Most companies find several stand-alone versions more cost effective.
- Continuity, easily implemented as DOS PC version may already operate in the company
- Easy to use software already available, PCs may play a bigger role now
- Have everything running on one operating system
- Provide multi-user access to packages such as Word, Lotus, Borland
- Numerous, if you have existing PCs cost effective, easy to implement, flexible development tools
- Easy to use software good expertise and skills of the DOS marketplace
- Bring GUI benefits to UNIX. Cost effective and would reduce the single user license fees

Exhibit V-5B: France (Cont.)

Advantages in Re-engineering from MS-DOS to UNIX

- It would allow smaller customers to upgrade their current systems
- PC driven, easy to use, good for client/server and windows environment
- Better resource sharing on word processing, real time integration to lotus type spreadsheets
- Good for to a departmental server environment, users already comfortable with this technology
- Large choice of software. Most customers already have DOS experience.
- Only have to purchase it once, integration

Exhibit V-5C: Germany

Advantages in Re-engineering from MS-DOS to UNIX

- Better service from PC type companies, everything on one machine
- Ideal at the low end, popular at the client end
- DOS is simple and used by most companies, cheap and inexpensive
- DOS packages are well received by users. Most companies are already using DOS.
- Autocad started as a DOS package. DOS packages shouldn't be underrated.
- Reasonably functional, cost effective 486 operated, excellent low end applications
- Good base of existing DOS software, save on individual licence fees
- PC applications already operating in our company, could be very cost effective
- Ease upgrade for smaller customers, well liked DOS environment
- Less expensive license ties, all applications including PCs on one operating system

Exhibit V-5C: Germany (Cont.)

Advantages in Re-engineering from MS-DOS to UNIX

- Users comfortable with DOS technology, very relevant in client/server situation
- Lots of applications to choose from, familiarity with DOS would gain confidence
- Don't need custom expertise as most people are familiar with DOS
- Availability of low cost software, proven abilities of DOS software
- Multi-user access to software, products are in demand, suitable for client/server environment
- Inexpensive to run, most already run under Windows
- Compatibility with Windows, low cost, high functionality
- Allow products like Dbase, word processing, etc. to run on the same hardware
- Cost effective for companies, easier upgrade path

Exhibit V-5 D: Benelux

Advantages in Re-engineering from MS-DOS to UNIX

- Upgrade PC applications to larger machine
- DOS packages are very user friendly. Easy uptake from operators
- DOS has a lot in common with UNIX. Cost benefit to customers
- Large familiarity with DOS, would be greatly welcomed by PC users
- Hundreds of packages to choose from, excellent low end choice
- I will buy a solution.
- Good entry level multi-user offering, probably be relatively inexpensive to buy
- Software like Sage started this way. Inexpensive and easy to operate
- Good for small applications, operators may already use PC applications
- DOS base has better user interfaces. Operators are more at ease with DOS based packages
- Easy to use, will have a large population of users

Exhibit V-5 D: Benelux (Cont.)

Advantages in Re-engineering from MS-DOS to UNIX

- Would allow traditional stand-alone packages to be run in a multi user environment
- Ability to share word processing and graphics packages
- Would allow DOS products to run in a multi-user environment
- Considerable applications are well developed, easy to use and have high confidence level
- Increased usage among software such as Word, Paradox, etc.
- Simple, easy to use software
- Allow the benefit of PCs in a bigger environment, PC applications are generally easy to use and high confidence

Exhibit V-5 E: Spain

Advantages in Re-engineering from MS-DOS to UNIX

- It would offer an upgrade path from proprietary to UNIX, could make the UNIX decision easier
- Plenty of PC software, user confidence, cost advantages
- Good for small installations, most operators are familiar with DOS
- Future commitment
- Reduced annual operating cost, more power per dollar
- Flexibility of hardware platform
- Multi user, more power hardware
- Non-DOS is PC based and should remain that way
- Bring DOS into a multi-user environment
- DOS and UNIX (low end) are almost seamless
- Good choice for PC user
- Multi-user, cheap software, easy to use
- Move its multi-user, low cost, easy training, low support costs
- You would have to consider if UNIX has any advantages over VMS

Exhibit V-5F: Italy

Advantages in Re-engineering from MS-DOS to UNIX

- Longer established and more proven.
- All PC applications could be held in central server
- Easy to do, software would run faster
- Existing integration
- Deal in server
- It's transparent. The user wouldn't notice any difference.
- Reduced license fees. Most people are familiar with DOS software, less systems management.

Exhibit V-5G: Sweden

Advantages in Re-engineering from MS-DOS to UNIX

- High awareness level of DOS. No high level systems expertise.
- Easy to do. Less technical knowledge required. Make use of existing PC's.
- Low cost easy upgrade, greater number of support agents.
- Cost. Easy to use. Alternative to network.
- Good for small applications. Operators like DOS, but need knowledge.
- Good if proven and particularly good in word processing and office applications
- Advantages only if you can move existing files.
- UNIX may be suitable for smaller departmental systems with updating to the AS400.
- Single platform. Multi user as opposed to network, single license fee.
- Increased multi user functionality and utilities ie; spooling batch transfers.
- Logical for small PC user.

Exhibit V-6A: United Kingdom

Disadvantages in Re-engineering from MS-DOS to UNIX

- Don't think it necessary when NT is widely available
- DOS software would have limited uses in our company.
- I just could not see this happening
- Cost, identical package will cost more by virtues of being UNIX
- I see no advantages over OS/2. Most PC packages will run under different systems anyway. Unnecessary, Digital NAS product will allow complete connectivity and interoperability with the operating system environment.
- It doesn't matter for what environment it was originally written.
- Performance loss
- Cost
- Size limitations
- Disruption, new training and costs may outweigh all advantages
- No advantage over Windows NT
- Will it perform any better than other UNIX products that are already on the market? No differentiation with NT

Exhibit V-6B: France

Disadvantages in Re-engineering from MS-DOS to UNIX

- Some DOS software may not lend itself to a multi-user type environment.
- Most porting is usually "top down," not "bottom up."
- Some DOS packages are stand-alone in nature.
- A low cost DOS package may lack the features in a UNIX environment.
- Some software applications might have operational difficulties in spreadsheet.
- Sometimes weak in financial ledger features
- Other than the ability to transfer existing drawings, I don't consider porting to be an issue.
- Lower level software may not suit larger installations.
- I think that most stand-alone DOS products should stay that way.
- The market would be limited. Spreadsheets, I believe, will remain an MS-DOS domain!
- The overall strength of the packages could be questioned.
- DOS packages may be under functional in mainstream applications exclude word processing and database
- Most DOS packages aren't multi user and may have low functionality level.
- It may not be practical in some instances.

Exhibit V-6C: Germany

Disadvantages in Re-engineering from MS-DOS to UNIX

- Managers like to keep confidential data on their PC. May be dangerous on a UNIX platform.
- DOS is strong in spreadsheets and word processing, but doesn't have depth in accounting, systems operation, processing and manufacturing
- Some DOS applications were not designed for a multi-user environment and could experience problems.
- Credibility in a large installation.
- Strong in financials but don't have great offerings in vertical or specialist applications
- Security aspect and back-up facilities would have to be improved
- I'm not convinced that a multi-user DOS package could run in a large systems environment.
- Limited, spreadsheets, EIS will remain in the DOS domain
- It may not be practical for some packages to become multi-user.

Exhibit V-6C: Germany (Cont.)

Disadvantages in Re-engineering from MS-DOS to UNIX

- May be under featured as this is relative to their low cost
- Some applications wouldn't run properly in multi-user environment
- Lower level applications
- Financial packages are generally low featured
- May need large modifications to increase their functionality
- Would lack the sophistication
- Everything
- Very few, it would seem to be a good option for the PC networks
- Limited use of the applications, too small in many cases

Exhibit V-6D: Benelux

Disadvantages in Re-engineering from MS-DOS to UNIX

- Only a size constraint, I would limit it to smaller UNIX systems.
- Might not address larger users requirements
- Large choice of similar native packages, this would only increase the number and would confuse the buyer.
- It doesn't matter where it originates from, providing it is an open system.
- May lack sophisticated features, could it realistically handle a large-user environment?
- Would be restricted to small installations
- Some packages are stand alone only
- How would it differ from OS/2?
- Maybe limited to smaller installations
- They may not be robust enough and have the systems security features for multi access
- They may be too simplistic,
- Most existing applications would be lower level and may not suit larger companies.
- Would need to tighten up on audit and the systems manager operations
- How would a stand-alone type package stand up in a multi-user environment?

Exhibit V-6E: Spain

Disadvantages in Re-engineering from MS-DOS to UNIX

- The software functionality would be no better.
- Applications tend to be more "down-market," limited to smaller sites
- Size limitations
- Lack of controlled access
- Disaster recovery
- Loss of performance, product wasn't meant for UNIX
- Limited to specific types of applications
- Cost of hardware upgrades, staff need to be more experienced
- Security aspects and data corruption concerns
- What advantage would it offer over a PC network?
- If you've decided on UNIX, you're better to consider true UNIX software.
- Unsophisticated and may not be suitable for complicated processes

Exhibit V-6F: Italy

Disadvantages in Re-engineering from MS-DOS to UNIX

- I don't know if it's necessary at all. There is a large choice of pure UNIX software
- I just wonder if some packages would be robust enough.
- Better to rewrite the system from beginning
- Could be costly
- Cost!
- Could make the packages too costly, Could threaten the "stand-alone" aspect if the PC
- Why do it? There is no shortage of UNIX software.
- Cost, time, new skills
- Cost, old software, performance would not be full utilized
- Software may lack features and functionality

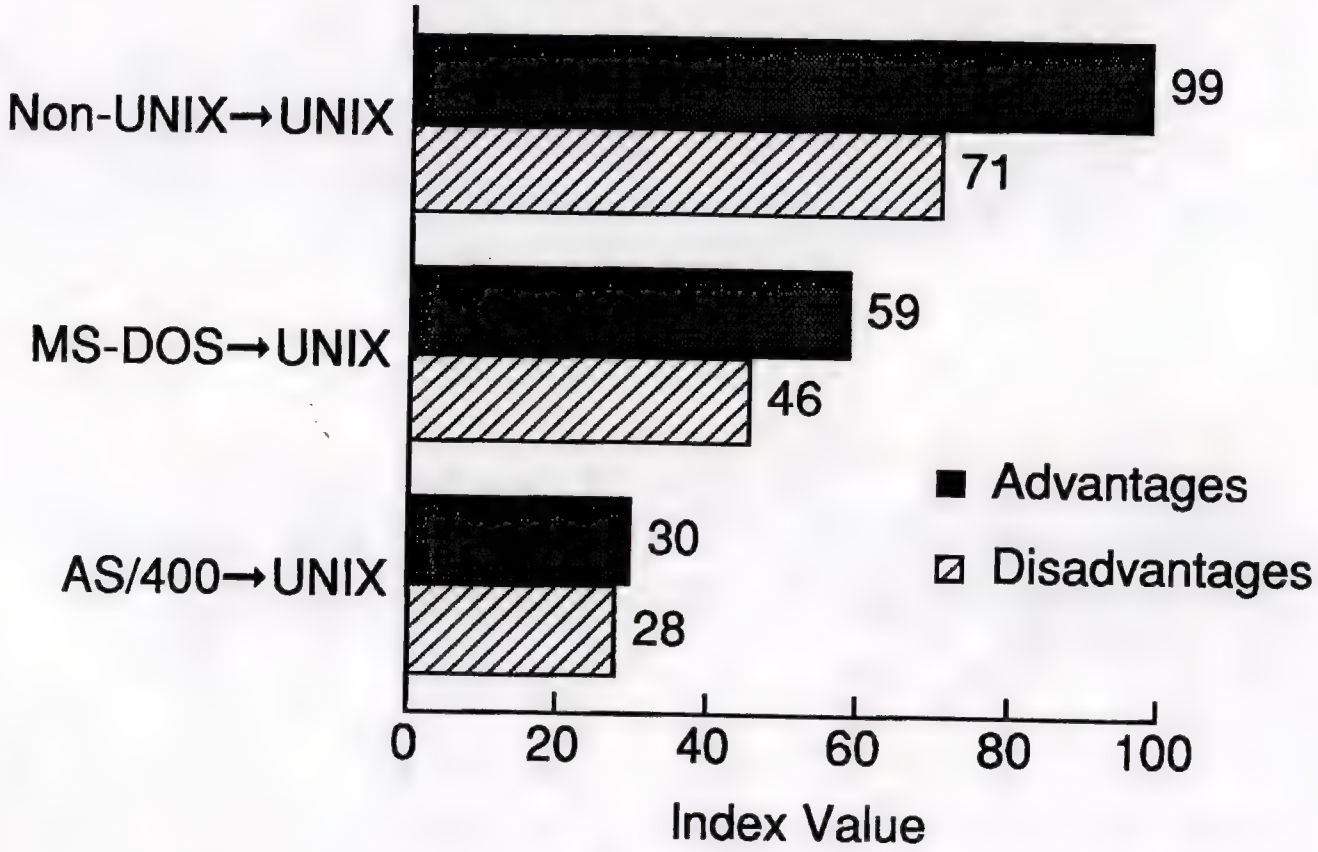
Exhibit V-6G: Sweden

Disadvantages in Re-engineering from MS-DOS to UNIX

- Software fit would be low.
- Short term and cost effective reasons
- Data integrity
- Lose the stand-alone function
- Limited use, not for larger sites
- Lack of features, DOS accounting packages tend to be straightforward, lack requirements for larger operations
- It is unnecessary as NT will provide all the features of UNIX
- Cost, DOS would no longer have the cost advantage.
- Would be too complex, deletes the reason why you would purchase DOS
- PC applications would remain as so

Exhibit V-7: Europe

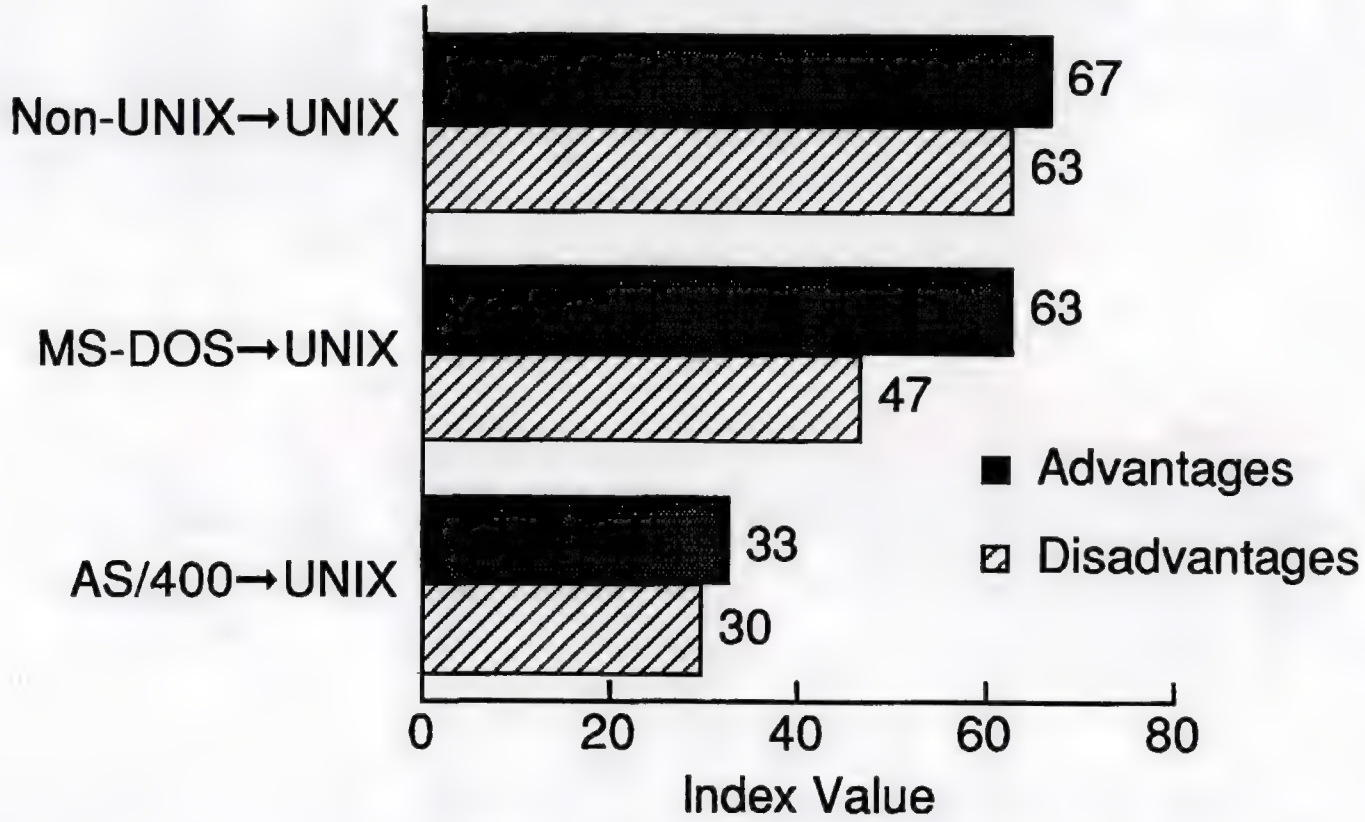
Index of Advantages & Disadvantages of Application Re-engineering



Note: Index value = Total mentions/number of respondents (210)

Exhibit V-7a: U.K.

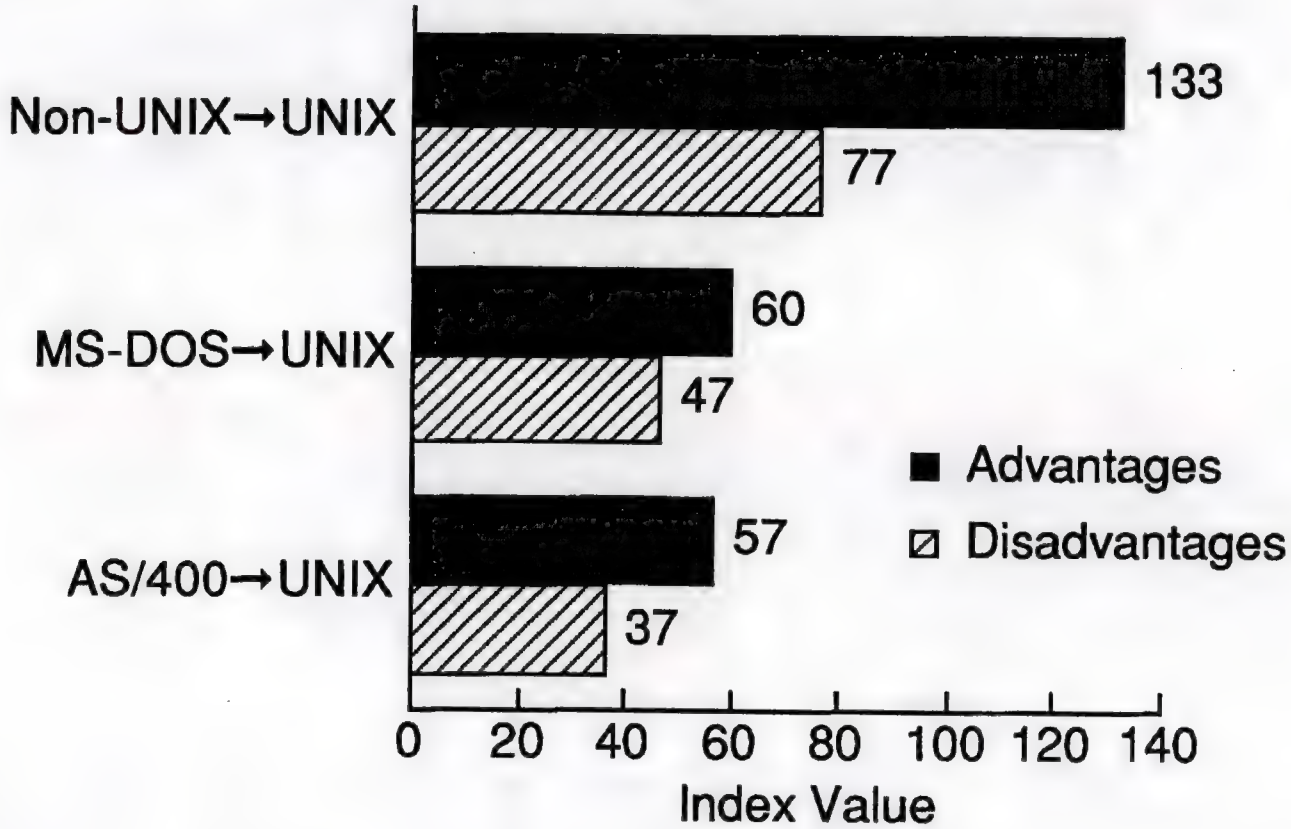
Index of Advantages & Disadvantages of Application Re-engineering



Note: Index value = Total mentions/number of respondents (30)

Exhibit V-7b: France

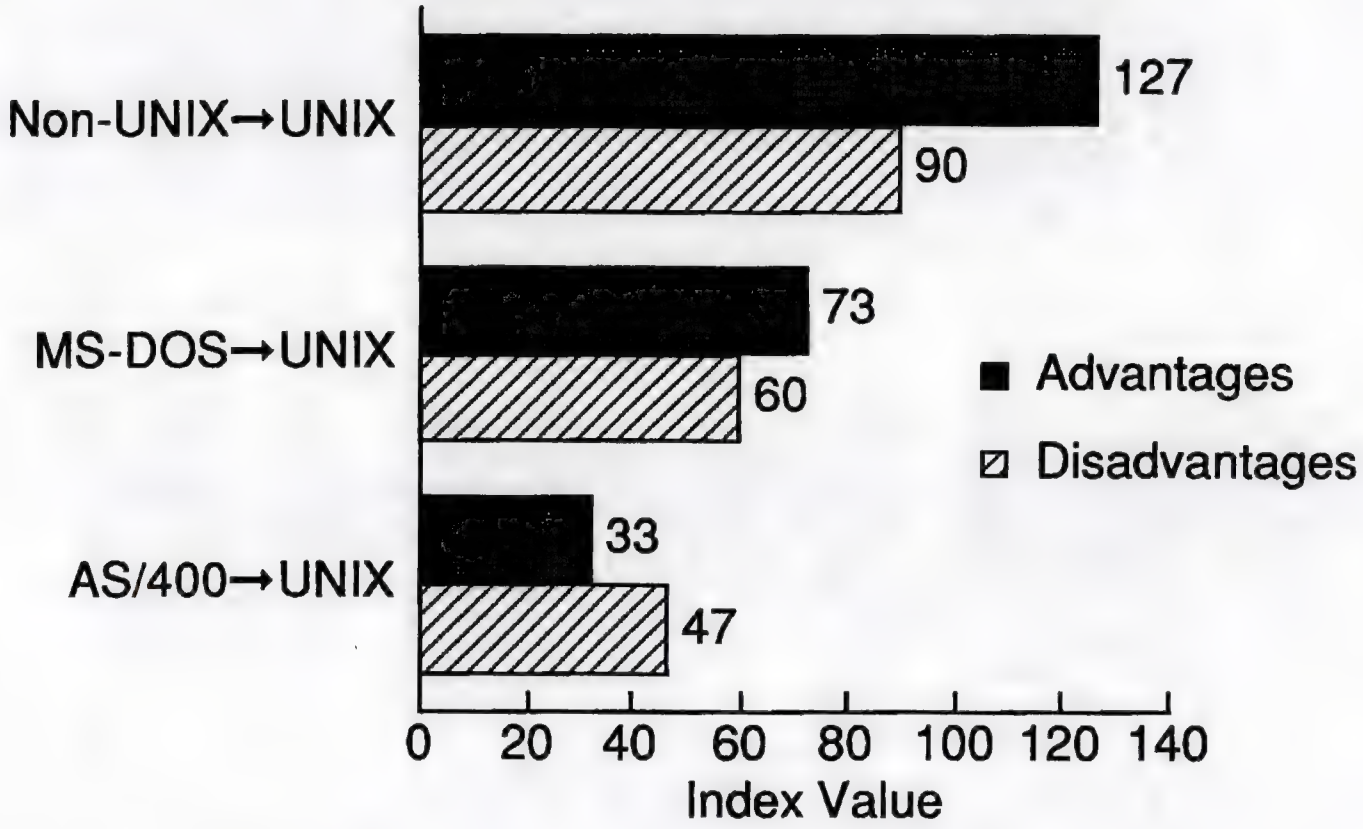
Index of Advantages & Disadvantages of Application Re-engineering



Note: Index value = Total mentions/number of respondents (30)

Exhibit V-7c: Germany

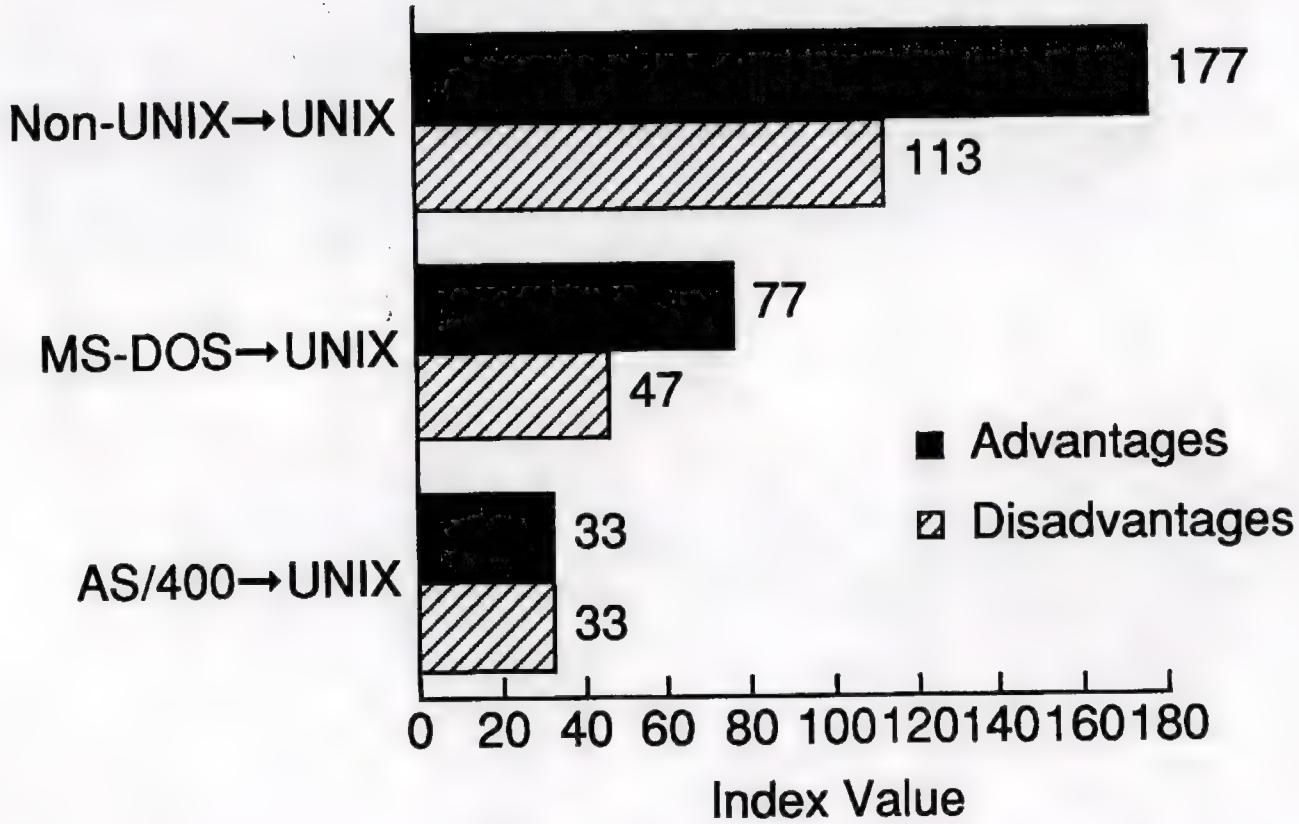
Index of Advantages & Disadvantages of Application Re-engineering



Note: Index value = Total mentions/number of respondents (30)

Exhibit V-7d: Benelux

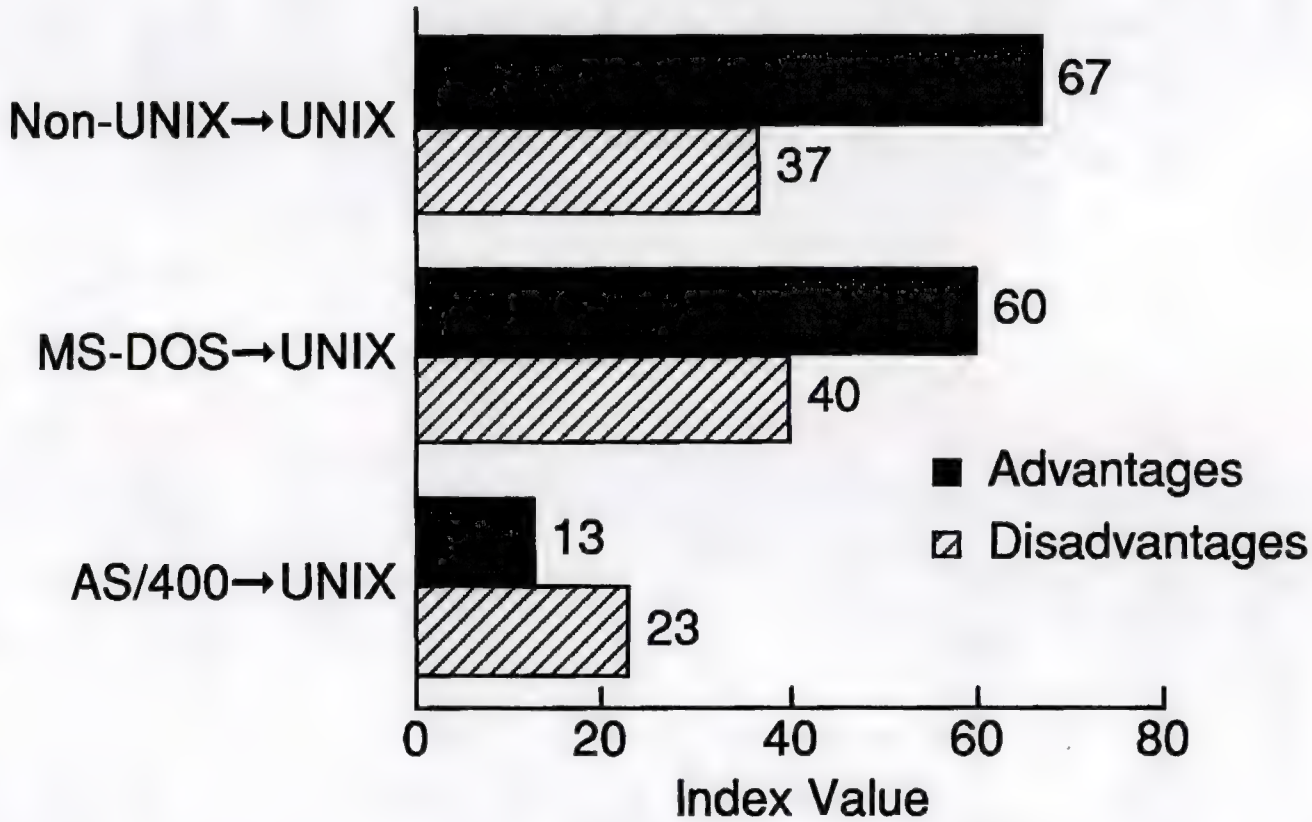
Index of Advantages & Disadvantages of Application Re-engineering



Note: Index value = Total mentions/number of respondents (30)

Exhibit V-7e: Spain

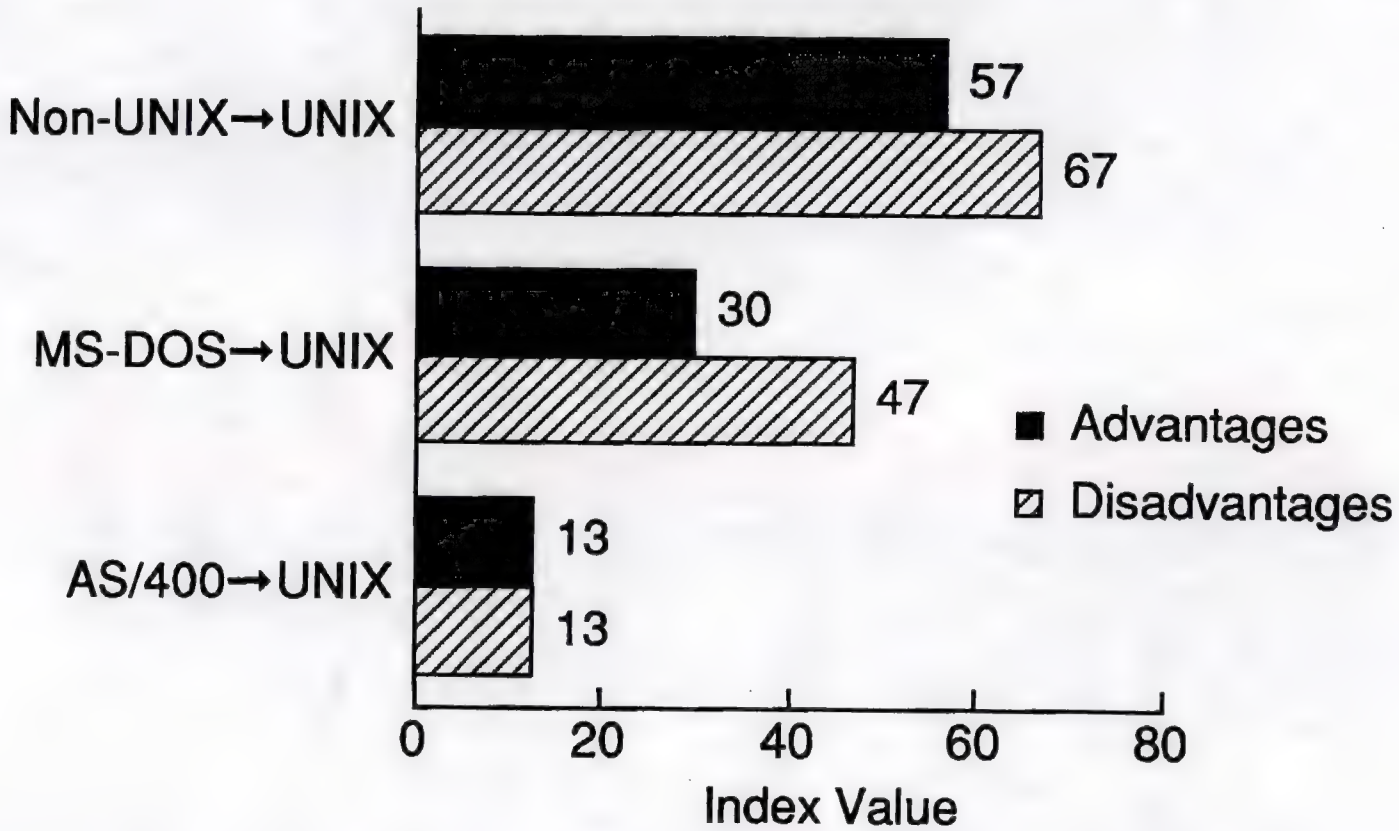
Index of Advantages & Disadvantages of Application Re-engineering



Note: Index value = Total mentions/number of respondents (30)

Exhibit V-7f: Italy

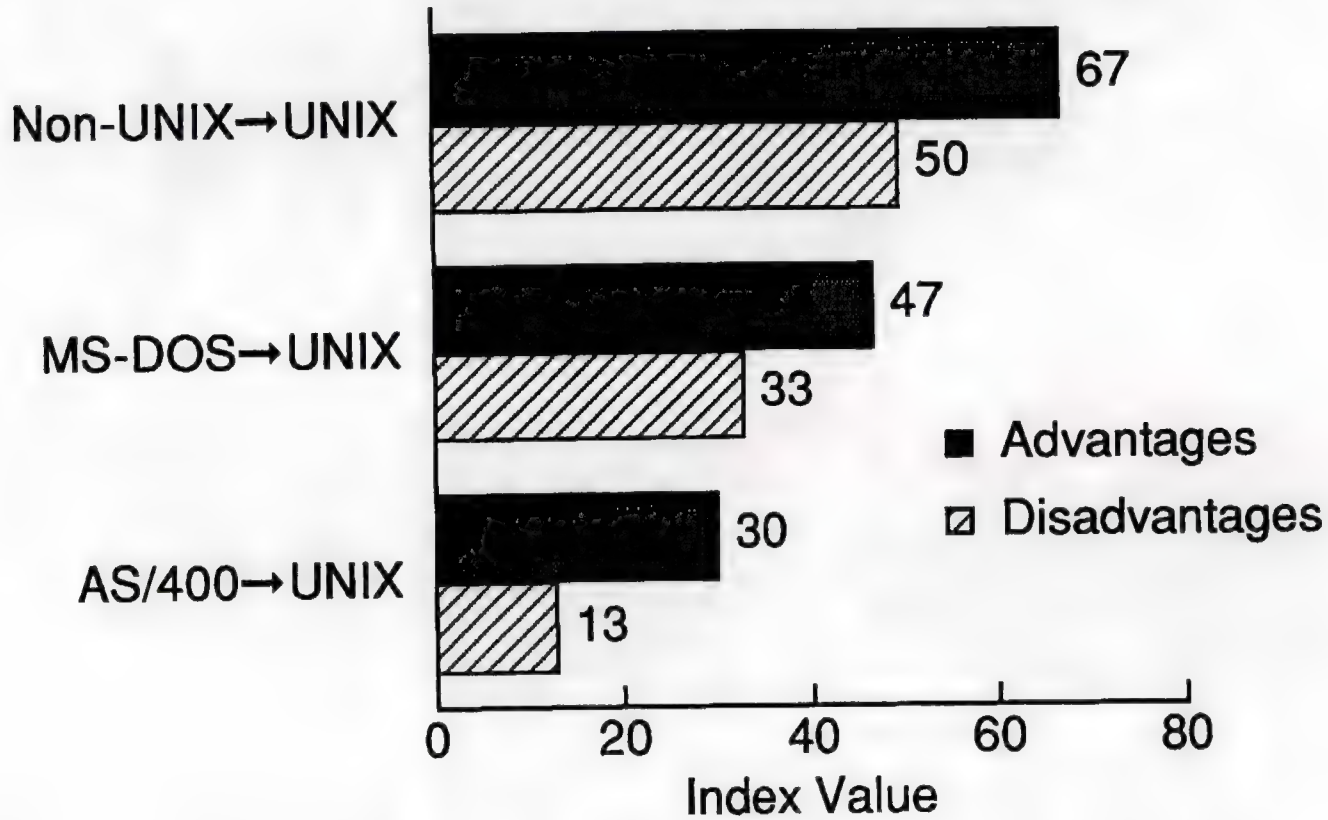
Index of Advantages & Disadvantages of Application Re-engineering



Note: Index value = Total mentions/number of respondents (30)

Exhibit V-7g: Sweden

Index of Advantages & Disadvantages of Application Re-engineering

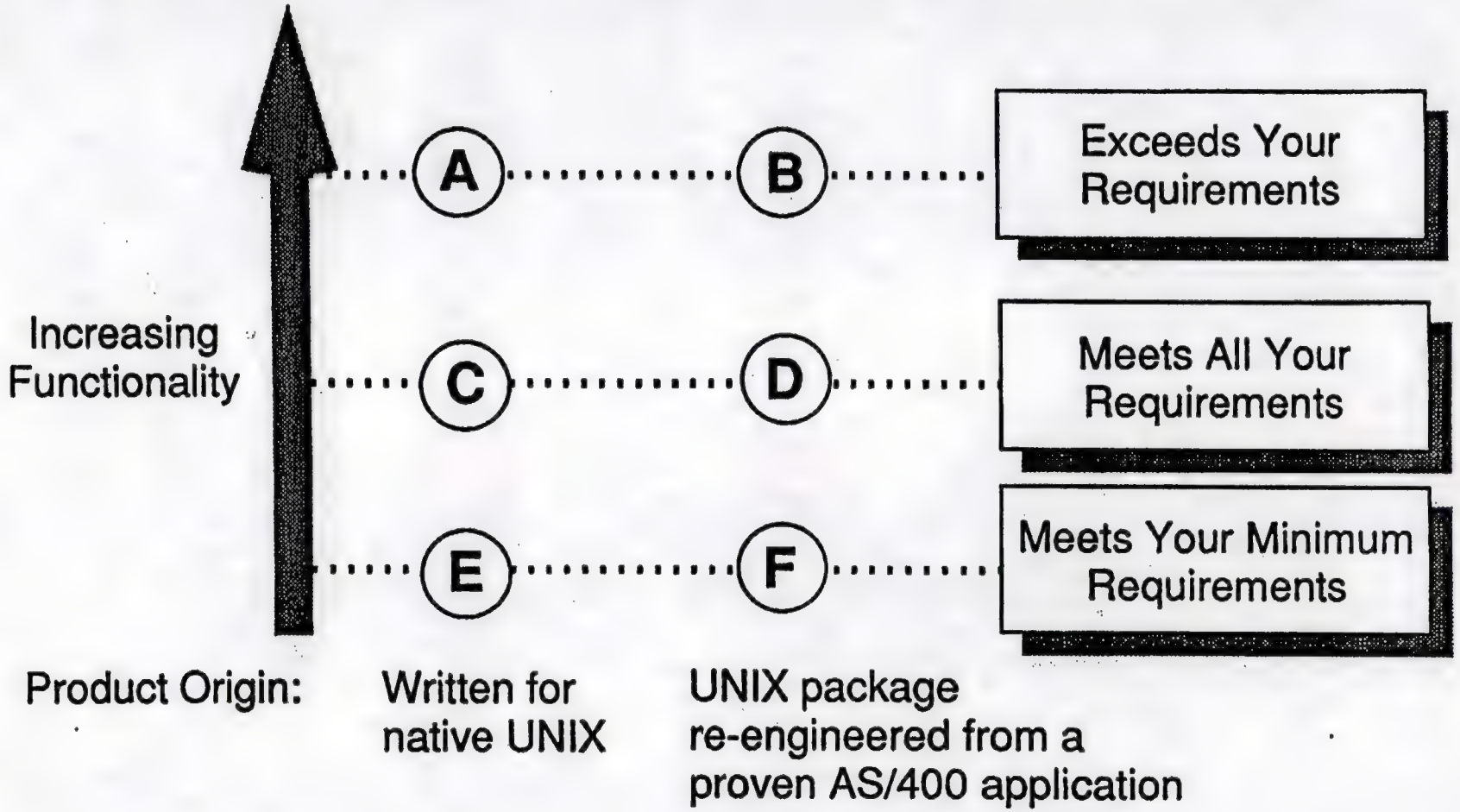


Note: Index value = Total mentions/number of respondents (30)

Exhibit V-8

Evaluation of UNIX-Based Manufacturing Packages

[Circled letters refer to different hypothetical software packages]



- Assumes that price, maintainability, and technical factors (e.g., response time, reliability) are equivalent for native UNIX and re-engineered packages)

Exhibit V-9: Europe

"Vertical" versus "Horizontal" Preferences

"Vertical"		
(Software origin most important)		**61%**
. UNIX:	37%	
. AS/400:	24%	
"Horizontal"		
(Looks at extent to which requirements are met and then chooses software origin)		**28%**
. UNIX:	0%	
. AS/400:	1%	
. Either:	27%	
Mixed (Not easily classifiable)		**11%**
. UNIX:	5%	
. AS/400:	2%	
. Either:	4%	

N=186

Exhibit V-9a: United Kingdom

"Vertical" versus "Horizontal" Preferences

"Vertical"
(Software origin most important) 61%

- UNIX: 47%
- AS/400: 14%

"Horizontal"
(Looks at extent to which requirements are met and then chooses software origin) 36%

- UNIX: 0%
- AS/400: 0%
- Either: 36%

Mixed (Not easily classifiable) 3%

- UNIX: 3%
- AS/400: 0%
- Either: 0%

N=28

Exhibit V-9b: France

"Vertical" versus "Horizontal" Preferences

"Vertical"
(Software origin most important) 54%

- UNIX: 22%
- AS/400: 32%

"Horizontal"
(Looks at extent to which requirements are met and then chooses software origin) 32%

- UNIX: 0%
- AS/400: 0%
- Either: 32%

Mixed (Not easily classifiable) 14%

- UNIX: 6%
- AS/400: 4%
- Either: 4%

N=43

Exhibit V-9c: Germany

"Vertical" versus "Horizontal" Preferences

"Vertical" (Software origin most important)	61%
. UNIX:	22%
. AS/400:	39%
"Horizontal" (Looks at extent to which requirements are met and then chooses software origin)	14%
. UNIX:	0%
. AS/400:	0%
. Either:	14%
Mixed (Not easily classifiable)	25%
. UNIX:	14%
. AS/400:	4%
. Either:	7%

N=28

Exhibit V-9d: Benelux

"Vertical" versus "Horizontal" Preferences

"Vertical"
(Software origin most important) 35%

- UNIX: 14%
- AS/400: 21%

"Horizontal"
(Looks at extent to which requirements are met and then chooses software origin) 34%

- UNIX: 0%
- AS/400: 0%
- Either: 34%

Mixed (Not easily classifiable) 31%

- UNIX: 10%
- AS/400: 7%
- Either: 14%

N=29

Exhibit V-9e: Spain

"Vertical" versus "Horizontal" Preferences

"Vertical"
(Software origin most important) 88%

- UNIX: 76%
- AS/400: 12%

"Horizontal"
(Looks at extent to which requirements are met and then chooses software origin) 12%

- UNIX: 0%
- AS/400: 0%
- Either: 12%

Mixed (Not easily classifiable) 0%

- UNIX: 0%
- AS/400: 0%
- Either: 0%

N=25

Exhibit V-9f: Italy

"Vertical" versus "Horizontal" Preferences

"Vertical"
(Software origin most important) 75%

- UNIX: 63%
- AS/400: 12%

"Horizontal"
(Looks at extent to which requirements are met and then chooses software origin) 25%

- UNIX: 0%
- AS/400: 0%
- Either: 25%

Mixed (Not easily classifiable) 0%

- UNIX: 0%
- AS/400: 0%
- Either: 0%

N=24

Exhibit V-9g: Sweden

"Vertical" versus "Horizontal" Preferences

"Vertical"
(Software origin most important) 50%

- UNIX: 17%
- AS/400: 33%

"Horizontal"
(Looks at extent to which requirements are met and then chooses software origin) 46%

- UNIX: 4%
- AS/400: 4%
- Either: 38%

Mixed (Not easily classifiable) 4%

- UNIX: 4%
- AS/400: 0%
- Either: 0%

N=24

Exhibit V-10: Europe

Software Origin Preferences

Native UNIX	42%
UNIX Package Re-engineered from AS/400	27%
Either Acceptable	31%
	100%

N=186

Exhibit V-10a: United Kingdom

Software Origin Preferences

Native UNIX	50%
UNIX Package Re-engineered from AS/400	14%
Either Acceptable	36%
	100%

N=28

Exhibit V-10b: France

Software Origin Preferences

Native UNIX	28%
UNIX Package Re-engineered from AS/400	36%
Either Acceptable	36%
	100%

N=28

Exhibit V-10c: Germany

Software Origin Preferences

Native UNIX	26%
UNIX Package Re-engineered from AS/400	43%
Either Acceptable	21%
	100%

N=28

Exhibit V-10d: Benelux

Software Origin Preferences

Native UNIX	24%
UNIX Package Re-engineered from AS/400	28%
Either Acceptable	48%
	100%

N=29

Exhibit V-10e: Spain

Software Origin Preferences

Native UNIX	76%
UNIX Package Re-engineered from AS/400	12%
Either Acceptable	12%
	100%

N=25

Exhibit V-10f: Italy

Software Origin Preferences

Native UNIX	63%
UNIX Package Re-engineered from AS/400	12%
Either Acceptable	25%
	100%

N=24

Exhibit V-10g: Sweden

Software Origin Preferences

Native UNIX	25%
UNIX Package Re-engineered from AS/400	37%
Either Acceptable	38%
	100%

N=24

Exhibit V-11: Europe

Software Origin Versus Selection Approach

	Software Origin Preference			
Selection Approach	UNIX	AS/ 400	Either	Total
"Vertical"	37%	24%	n/a	61%
"Horizontal"	0%	1%	27%	28%
"Mixed"	5%	2%	4%	11%
TOTAL	42%	27%	31%	100%

N=186

Exhibit V-11a: United Kingdom

Software Origin Versus Selection Approach

	Software Origin Preference			
Selection Approach	UNIX	AS/ 400	Either	Total
"Vertical"	47%	14%	n/a	61%
"Horizontal"	0%	0%	36%	36%
"Mixed"	3%	0%	0%	3%
TOTAL	50%	14%	36%	100%

N=28

Exhibit V11b: France

Software Origin Versus Selection Approach

	Software Origin Preference			
Selection Approach	UNIX	AS/ 400	Either	Total
"Vertical"	22%	32%	n/a	54%
"Horizontal"	0%	0%	32%	32%
"Mixed"	6%	4%	4%	14%
TOTAL	28%	36%	36%	100%

N=28

Exhibit V-11c: Germany

Software Origin Versus Selection Approach

	Software Origin Preference			
Selection Approach	UNIX	AS/ 400	Either	Total
"Vertical"	22%	39%	n/a	61%
"Horizontal"	0%	0%	14%	14%
"Mixed"	14%	4%	7%	25%
TOTAL	26%	43%	21%	100%

N=28

Exhibit V-11d: Benelux

Software Origin Versus Selection Approach

	Software Origin Preference			
Selection Approach	UNIX	AS/ 400	Either	Total
"Vertical"	14%	21%	n/a	35%
"Horizontal"	0%	0%	34%	34%
"Mixed"	10%	7%	14%	31%
TOTAL	24%	28%	48%	100%

N=29

Exhibit V-11e: Spain

Software Origin Versus Selection Approach

	Software Origin Preference			
Selection Approach	UNIX	AS/ 400	Either	Total
"Vertical"	76%	12%	n/a	88%
"Horizontal"	0%	0%	12%	12%
"Mixed"	0%	0%	0%	0%
TOTAL	76%	12%	12%	100%

N=25

Exhibit V-11f: Italy

Software Origin Versus Selection Approach

	Software Origin Preference			
Selection Approach	UNIX	AS/ 400	Either	Total
"Vertical"	63%	12%	n/a	75%
"Horizontal"	0%	0%	25%	25%
"Mixed"	0%	0%	0%	0%
TOTAL	63%	12%	25%	100%

N=24

Exhibit V-11g: Sweden

Software Origin Versus Selection Approach

	Software Origin Preference			
Selection Approach	UNIX	AS/ 400	Either	Total
"Vertical"	17%	33%	n/a	50%
"Horizontal"	4%	4%	38%	46%
"Mixed"	4%	0%	0%	4%
TOTAL	25%	37%	38%	100%

N=24

Exhibit V-12

Degree to Which Requirements Are Met: Importance

- "Exceeds your requirements" and "Meets all your requirements":
  - Evenly split between *first* and *second* choice
  - No appreciable differences between UNIX and AS/400
- "Meets Miminum Requirements": Almost always *third* choice
- Platform preferences are almost always absolute: Miminum requirements in preferred platform are more acceptable than exceeding requirments on the other platform

Exhibit V-13

Comments From Those Favoring Native UNIX and Are Resistant to Considering Re-engineered AS/400

I've never seen a software product take full advantage of new technology when it is re-engineered.

Nothing would make me consider the AS/400 alternative [said several times].

Better use of UNIX technology if a system is designed for it.

My experience with re-engineering is that it's a conversion of an old design.

A re-engineered product is not as helpful as a new product.

UNIX is the installed base and the strategic direction of our company.

Have had better experience with native UNIX.

Don't have a lot of faith in a re-engineered product.

Exhibit V-14

Comments From Those Favoring A Re-engineered AS/400 Product And Are Resistant to Considering Native UNIX

The AS/400 has been proven.

Would have to improve on the original's functionality.

Nothing would make me consider the native UNIX alternative [said several times].

When software is re-engineered you get a little better functionality.

Get upgraded function when going from the AS/400.

AS/400 has more flexibility than UNIX.

I know the AS/400 [said several times].

I don't know UNIX.

We already are running code that was originally AS/400 on a UNIX system.

Would consider if retraining users was minimal.

Report

DETERMINING THE RECEPTIVITY OF UNIX SOFTWARE IN THE DISCRETE MANUFACTURING SECTOR IN THE EUROPEAN MARKET

Submitted to

ANDERSEN CONSULTING

November 30, 1993

Submitted by

INPUT

The Atrium at Glenpointe
400 Frank W. Burr Boulevard
Teaneck, New Jersey 07666

201-801-0050
Fax: 201-801-0441

I. BACKGROUND AND METHODOLOGY

A. Background

Andersen Consulting is considering porting MACPAC for the AS/400 to the HP/Informix platform. Andersen wishes to understand buyer reception to such a product offering. INPUT was originally commissioned in June 1993 to conduct market research in the U.S./Canada market to gauge likely buyer receptivity. The research consisted of 125 structured interviews with discrete manufacturing firms in the U.S. and Canada. (In July 1993 INPUT conducted a follow-on study from a subset of the sample to gauge to acceptability of native UNIX versus re-engineered AS/400 manufacturing packages.)

In September 1993, INPUT was requested to conduct the same research in seven European countries. This report contains the results of this European research. This report follows the same structure as the earlier report to the extent possible (including exhibit numbering) to facilitate comparisons. This report draws attention to similarities and differences that INPUT finds noteworthy.

B. Methodology

The questionnaires used were identical to those used in the earlier study.

Respondents were qualified and categorized in the following ways:

- Thirty firms were interviewed from each of the following countries: the UK, France, Germany, Benelux, Spain, Italy, Sweden. This produced a total of 210 interviews.
- Discrete manufacturing firms were interviewed.
- Company sizes are shown in Exhibit I-1.
- Firms interviewed planned at least one replacement for a manufacturing-related application in the next three years. [If no replacement was planned, the company was excluded from the rest of the study.]
- Packaged software should be considered for at least one application by those planning a replacement.
- Respondents should be part of the recommendation/approval process for selecting new applications.

Respondents were classified by both their title level and their organizational area (Exhibit I-2).

- About one-third of the respondents were from the IS area, most of them in executive positions.
- Almost all of the remaining interviewees came from management positions in applications or functional areas.
- Applications specialists, either in a functional area or in an applications, unit accounted for the remainder of the interviewees.
- This mix is consistent with other INPUT studies which have shown a steady migration, or sharing, or responsibilities between the traditional IS unit, end user areas and new organizational structures which address application systems needs.

Respondents were quite forthcoming and frank and answered questions as completely as they could.

The questionnaire was a mixture of rating questions and open-ended questions. Where there were clusters of answers in an open-ended question, these were grouped and classified. In other cases, where the number of responses were too small or responses were quite scattered, extracts of the actual replies are presented.

The data which follows shows results for the entire sample of respondents as well as for individual countries where there is enough data to support individual country analysis. The convention is used throughout the report of titling country exhibits "..a" through "..f" after an initial "European" exhibit. The "European" are unweighted, that is, the results from the seven countries are added and divided by seven; Andersen may wish to apply other weights. (However, INPUT experimented with some weighting and found that it did not affect the overall results appreciably.)

II. APPLICATIONS REPLACEMENT AND MARKET SIZE

A. Replacement Plans

Near term replacement plans are a critical factor for Andersen's plans. Exhibit II-1 shows a high degree of replacement planned in all major areas. Financial applications show the highest replacement rate. Overall, these findings are similar to that for the U.S.

Respondents were asked to assign probabilities to replacement.

- Probability of replacement is high, although somewhat lower overall than in the U.S. study.
- The situation appears to be broadly the same across individual countries.
- These percentages exclude those who could not give a probability; therefore, the replacement rates may even be conservative.

These replacement plans are driven by a variety of factors, many of them mutually reinforcing. Exhibit II-2 has classified these reasons using the same categories as for the U.S, study. The priorities are in the same general order, although the intensity of needs in Europe appears somewhat lower than in the U.S. (Note: There was not enough data from individual countries to provide meaningful breakdowns by country.)

About half the respondents are likely to use packaged software as the replacement (Exhibit II-3). Europeans appear less likely to consider packaged engineering software than U.S. firms. This picture holds true across individual countries.

- In the U.S. virtually all firms are *considering* packaged software (the figures in Exhibit II-3 are for firms that give packaged software use a probability of 75% or more). However, in Europe, for each of the applications a third or more of firms are not currently considering packaged software.
- Almost half the firms surveyed are in fact evaluating one or more packages now (Exhibit II-4). This is the same situation as in the U.S.
- Exhibit II-5 is a list of applications packages which firms were willing or able to cite as currently under evaluation. Note the wide array of vendors; no vendor appears to have a lock on this market. (Note: Because of translation and transcription, not all of the packages -- especially acronyms -- may have been captured accurately.)

Exhibit II-6 shows the hardware/software operating environments being considered for new applications (in some cases there is more than one under consideration).

- As in the U.S. the UNIX environment is being considered more than any other single environment.
- The proprietary environments as a group are being looked at by about four out of ten of the firms interviewed.
- Note that the AS/400 was the most frequently cited environment, slightly more than in the U.S..
- INPUT believes that the proprietary platforms are more likely to be rejected in the evaluation process.
- On the other hand, Windows NT and its successors are likely to be much more of a factor in the medium term, i.e., further out than three years.

Overall, INPUT believes that UNIX-based applications will prove to be quite acceptable in this market. INPUT believes the UNIX proportion of the overall market to be in the 40-50% range over the next three years.

- Further out, much will depend on both the real and apparent success of NT (and OS/2, to a degree).
- The result is a window of opportunity in the short term and the potential for greatly increased competition in the longer term. Therefore, INPUT believes that early entry by Andersen into the UNIX market will be a key success factor.

III. PACKAGE SELECTION CRITERIA

The package selection criteria are arranged in Exhibit III-1 in the order of importance found in the U.S. study.

- Functionality and ease of use are more important in the U.S. than in Europe. In the U.S. nine out of ten companies found these two criteria important.
- Otherwise, the pattern is similar between the U.S. and Europe.
- There are some apparent differences between European countries. However, INPUT believes that more study would be required before placing absolute reliance on these figures (largely because of sample sizes).
- Technology factors (client/server and portability) are the least important factors on the list, as in the U.S..

The survey looked at these issues another way, by asking respondents what advice they would give to vendors on what should be included in the next generation of software. These results are reported in Exhibit III-2. European respondents had less advice to give than their U.S. counterparts, so the results could not be meaningfully reported by country.

- The general category of a better technical environment and associated efficiency and performance were issues cited by many of the respondents.

As in the U.S., the actual software package selection process is generally a joint effort in the companies interviewed, with representatives from both IS and the functional area(s) involved.

IV. ASSESSMENTS OF OPERATING ENVIRONMENTS

A. General Assessments of Operating Environments

Respondents were asked to rate five of the principal operating environments (Exhibit IV-1).

- UNIX received the highest ratings, OS/2 and MVS the lowest. The pattern is very similar to the U.S. findings. Overall the European respondents rated all operating environments somewhat lower than ratings given in the U.S.

- The low ratings are quite low for this kind of survey; the UNIX ratings are acceptable, but do not indicate an impregnable position. Note that Germany, France and Benelux give UNIX much higher ratings

- There was little difference between ratings for 1994 and 1996.

In addition to the single point ratings above, respondents were also asked to give what they saw as the strengths and weaknesses of these operating environments. The comments for each operating environment are in Exhibits IV-2 through IV-11.

- These strengths and weaknesses, while covering a lot of ground, do not contain any real surprises.

- Exhibit IV-12 provides an unweighted summary of the points made (this exhibit is taken from the U.S. study).

- INPUT draws attention to Windows NT: The main weakness is that it is new.

Exhibit IV-13 provides an "index" of the strengths and weaknesses for each environment by counting the number of items mentioned as a strength or weakness and dividing by the total number of respondents; this takes into account of multiple reasons given by some respondents. The picture for individual countries is very similar. There are interesting differences between the U.S. and Europe:

- There were many more comments in Europe, especially for UNIX, AS/400 and Windows/NT. This may reflect cultural differences somewhat, where U.S. respondents to this kind of study are more comfortable with rating questions (as in Exhibit IV-1) and Europeans more comfortable with open-ended questions.

- UNIX scores extremely high. Windows/NT scores high also, considering respondents unfamiliarity with this new product.

- OS/2 and MVS (included for "control" purposes) rank about as low as in the U.S.

B. Suitability of Selected UNIX Platforms for Running Manufacturing Applications

In the preceding section, general environments were evaluated. Respondents were also asked about the suitability of specific UNIX hardware and DBMS environments for running manufacturing applications.

- HP was rated as the most suitable hardware platform (Exhibit IV-14). Sun, IBM and DEC (Alpha) were all fairly close behind. The general priorities are the same as in the U.S., however, U.S. ratings were about a point higher overall compared to Europe.

DBMS products were clustered fairly tightly, about the same as in the U.S. (Exhibit IV-15).

Respondents are asked to cite particular hardware/DBMS combinations that they "believed would be particularly attractive". Exhibit IV-16 lays out these volunteered responses.

- In some case multiple combinations were provided.
- In other cases, respondents would name only a hardware or only a DBMS platform.
- In hardware, HP was cited most overall. (IBM was relatively more popular in the U.S.)
- Oracle and Informix were the most cited among the DBMSs. (Sybase was cited much more often in the U.S.) Ingres' rate of citation was exceptionally good, given that Ingres was not part of the formal questionnaire process.
- No particular combinations were dominant; only the HP/Oracle combination broke into double digits; some combinations were not cited at all.
- The Informix/HP pair was only cited four times. [Note: This question was asked after and as a follow on to the rating question, so Informix was positioned as well as Oracle, Progress of Sybase for recall.]

It is INPUT's belief that the hardware part of the hardware/DBMS pairing will be more important in the marketplace. Consequently, HP's higher rating is more important than Informix's rating.

"Other" platforms and combinations were cited more often in Europe than in the U.S., as might be expected given the more fragmented market, especially for hardware. (See Exhibit IV-17.)

V. UNIX PORTING ISSUES

A. Attitudes Toward Porting

One of the sections of the interview focussed on respondents' attitudes toward re-engineering/porting of an application to UNIX that was originally written for another operating system. There were three related sets of questions asked:

- The general advantages and disadvantages in going from a non-UNIX to a UNIX environment.
- The specific advantages and disadvantages in going from the AS/400 to UNIX.
- The advantages and disadvantages in going from MS-DOS to UNIX [This was a "control" question.]

Exhibits V-1 to V-6 provide the detail on the comments made for advantages and disadvantages.

- Overall, the advantages seen were an increased probability that an application would work and contain the necessary functions; also, that time and expense would be reduced.
- Disadvantages include a general doubt that such conversions can be effective along with the associated questions as to
  - Whether all of the original functionality will be carried over onto the new platform.
  - Whether full advantage will be taken of UNIX's capabilities.

Overall, Europeans were more favorably disposed to the principle of re-engineered applications than firms in the U.S., as shown in the summary in Exhibit V-7. Germany, France and Benelux were the most favorably disposed, the UK least.

- As in the U.S. there appeared to be an underlying belief that dissimilarities in architecture would cause problems.

INPUT believes that these findings should be taken into account when preparing the product for market, for example,

- Certain technical objections can be dealt with in advance (e.g., feature transference and UNIX efficiency).
- It might prove advantageous, for example, to point to the past use of the functional components without stressing the platform origins.
- Further research on the reaction of initial prospects may also be in order.

B. Comparing Acceptability of Native Unix and Re-engineered AS/400 ManufacturingSoftware Packages

This section reports on the relative acceptability of products written in native UNIX compared to products re-engineered from an existing AS/400 application. (This is comparable to the findings of the July 1993 U.S. followup study.)

1. Principal Approaches for Selecting Software

By looking at the rankings and taking comments into consideration, there are two principal ways in which software packages are selected.

- Companies for whom the software's origin (native UNIX or re-engineered AS/400) is the determining criteria; *then* the level of functional requirements is decided on. This is called the "vertical" selection approach in this report, since the *columns* in Exhibit V-8 are controlling. Almost two-thirds of the companies interviewed fall into this category.

- The other principal approach is for a company to first determine what level of requirements is most suitable and then decide which, if any, software origin is favored. This is called the "horizontal" approach here, because the *rows* in Exhibit 1 are controlling. About a quarter of the companies interviewed fall into this category.

- About 10% of the companies interviewed fall into a mixed category of selection, where complex combinations of requirements and software origin were used.

- These are very close to the U.S. findings.

Exhibit V-9 summarizes the preferences for the vertical, horizontal and mixed approaches. Within each approach there can be a further preference for native UNIX or re-engineered AS/400 (either origin can be acceptable in the horizontal or mixed approaches).

- Exhibit V-10 summarizes the preference for software origin.

  - Almost half prefer a native UNIX product

  - Over one-quarter prefer a re-engineered AS/400 product

  - About one-third would accept either (i.e., their motivation is purely requirements driven). This is much higher than in the U.S.

Exhibit V-11 combines the data from Exhibits V-9 and V-10 in a matrix, showing the combinations.

2. Importance of the Degree to Which Functional Requirements Are Met

In rating the importance of functional selection criteria, respondents almost always give first choice to either "exceeds your requirements" or "meets all your requirements". Respondents were split evenly between which of the two was most important. "Meets minimum requirements" was usually the third choice.

This split was uniform between "vertical" and "horizontal" selection criteria as well as whether native UNIX or re-engineered AS/400 was favored.

Exhibit V-12 summarizes this situation. (Exhibit V-12 is the same as in the U.S. report.

3. Reasons for Preference

Because of the way in which the issues were presented to the respondents, the reasons for preferring native UNIX over re-engineered AS/400 (or vice-versa) are a mixture of positives and negatives.

- Native UNIX is seen as a better technical fit and more efficient than a re-engineered AS/400 product.
- As found earlier, there seems to be fairly wide doubt whether all of the functionality of the re-engineered product can be carried over onto the UNIX platform and whether full advantage will be taken of the UNIX's technical capabilities.
- The re-engineered AS/400 product, on the other hand is seen as a tested, working product.

4. Likelihood of Equating Native UNIX and a Re-engineered AS/400 Product

After respondents had stated their preferences, they were probed as to the conditions under which they would be willing to change their preference (i.e, to put native UNIX and re-engineered AS/400 on the same footing).

Having taken a position favoring either native UNIX or a re-engineered AS/400 product, even more respondents than in the U.S. were quite resistant to describing the conditions where the other product would be viewed equally. The comments appear to be in line with the more extensive U.S. comments which are reproduced in the following exhibits.

- Exhibit V-13 contains comments which illustrate the resistance toward re-engineered AS/400 products by those favoring native UNIX.
- Exhibit V-14 contains comments coming from those favoring a re-engineered AS/400 product and resistant to native UNIX.

The reasons for resistance are similar to those supporting a particular software origin in the first place.

Another, somewhat smaller group *would* consider the alternative. These comments can be summed up as: "Prove there isn't much difference and I'll consider alternatives."

5. Summary

The origins of a software product for the UNIX platform are important.

- A large group of companies will confine their evaluations to either native UNIX or re-engineered AS/400 products (given that choice).
- Even where meeting or exceeding requirements is the primary criterion, the origin of the software is still important.

About half of the companies interviewed would prefer native UNIX products. They are not sure that all of the functionality of a re-engineered AS/400 product would survive and, an overlapping thought, are not sure that the re-engineered product would take full advantage of the UNIX environment.